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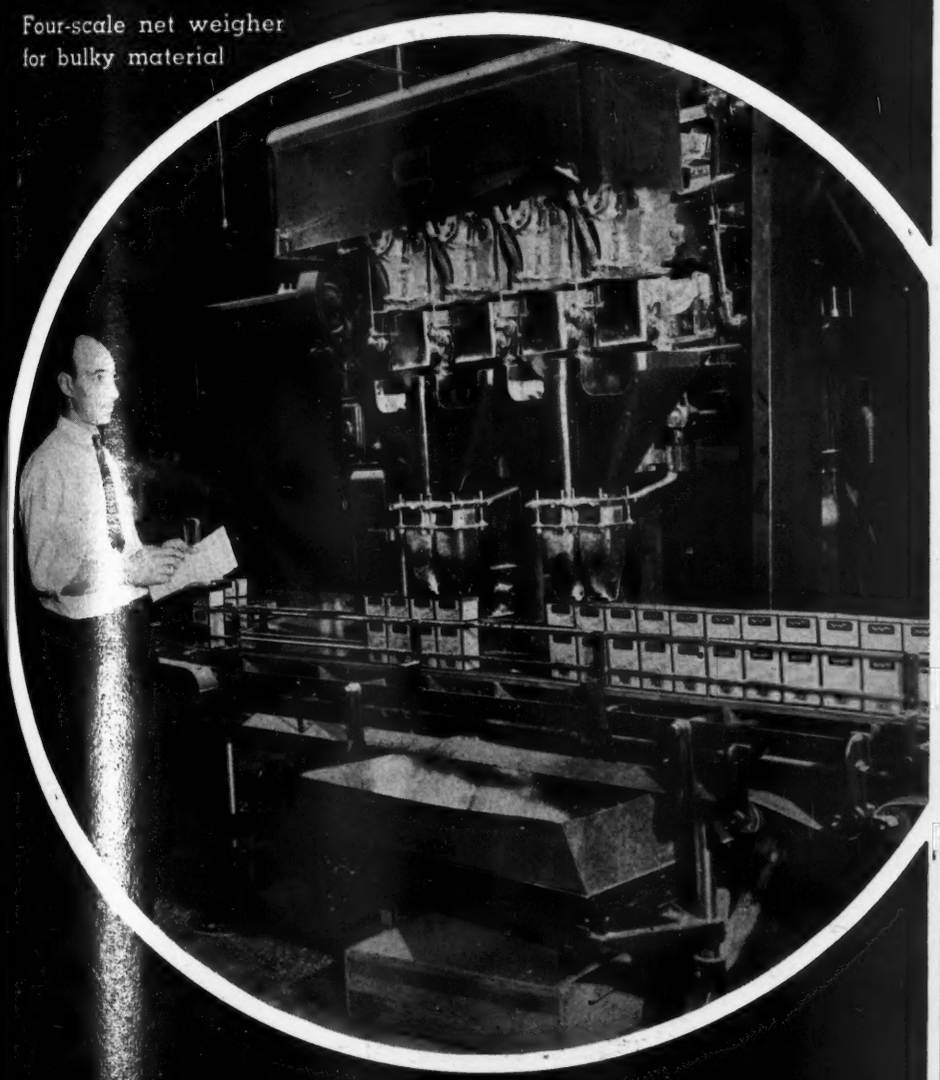
NATIONAL EDITION

FOOD INDUSTRIES

• FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



Four-scale net weigher for bulky material

JUNE 1948

PEELING WITH LYE —F. I. Special Report

Glycol System for Air Conditioning

Flash Processing, Aseptic Can Filling

Flour Bleaches Appraised

Pepsi-Cola Cuts Case Handling Cost

Lard Takes on New Properties

Problems in Packaging Macaroni

McGRAW-HILL PUBLICATION

"LAMINATED Paraply Packages keep our baked goods Fresh!"

"It's Marathon lamination that does it! Look how the inside greaseproof paper is bonded to the strong paperboard. Between them lies the extra, third layer of protection in Paraply Bakery Pa ages—the laminating agent that bi paper to paperboard and provides a m tureproof barrier in itself!"

Alert bakers know the sure-fire sales value of the *triple* protection built into Marathon's Paraply Packages. *Three* separate barriers to loss of moisture and shortening content assure maximum protection for the oven-freshness of your baked goods. Paraply ages are made with two types of lamination for ich shortening ent. Use the lls. Use the nuts,

ckage iden- Bak- ns in-

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MEMO

This recent ad demonstrated to the baking industry the exceptional product protection provided by Paraply Bakery Packages - another of Marathon's top-quality packaging developments

For further information on Marathon's complete packaging service for the baking industry, ask your Marathon salesman or write direct to Marathon Corporation, Menasha, Wisconsin.

MARATHON

5,000,000 Youngsters Need Our Help Now

THE bumper wartime crop of babies, about 5,000,000 larger than the population experts expected, is reaching school age.

At school these youngsters should find a good education awaiting them. That is their most cherished American birthright.

But unless something is done quickly, millions of these children will be cheated. They will crowd into classrooms already run on double shifts. They will move in with children who are now sitting two in a single seat. They will read germ-loaded books mangled by a generation of use by grimy hands.

I

So the continuing crisis in American education is given a new twist by unexpected pressure on school plant and equipment.

The U. S. birthrate has jumped by leaps and bounds. Instead of declining in the '40s, as the experts expected it would, the rate climbed from 17.9 per thousand in 1940 to 21.5 in 1943. It jumped to 25.9 in 1947, an increase of 45 percent since 1940. Result—by 1956 elementary school attendance in the United States is expected to jump from 18,200,000 to more than 23,400,000, an increase of about 5,200,000, or more than one-fourth.

The rush has already begun. It will pick up speed next fall.

Now, while this pressure has been building up, our public schools and their equipment have been running down—first through inevitable wartime neglect, then because inflation and material and labor shortages made it difficult to catch up.

If we are to give this bumper crop of youngsters the break they deserve—and reach the educational standards the nation needs—we must speedily do a major job of educational rehabilitation and expansion.

II

Some headway has been made in overcoming the teachers' salary crisis.

Teachers' salaries are improving. Pay problems were driving good teachers away from their posts in droves not long ago. But in the year since the 57th editorial in this series emphasized that crisis, the average teacher's annual salary has increased about $300—from $2250 to $2550.

True, increases vary enormously from state to state and from town to town. In a few states the average increase has been $500; in some less than $100. But, for the nation as a whole, last year's increase put teachers about even in the race with the cost of living. After taxes, their salaries have risen 68%, and the cost of living 67%, since 1939. In terms of pay increases, however, they are not nearly as well off as are industrial workers, whose average weekly wages after taxes have risen 108% since 1939. They are far behind farmers, whose net income is now four times what it was in 1939. And teachers had notoriously low salaries to start with.

A great deal more needs to be done in raising salary standards to put our school system on a firm footing. There are still about 100,000 teachers, nearly 12% of all public school teachers, who hold temporary or emergency credentials. They cannot meet

prevailing standards, and not very severe standards at that, for persons holding their posts.

The salary crisis, however, is easing.

III

But now comes the new crisis in school buildings and equipment.

We would have been hard put to get our schools back into shape after years of wartime neglect—even without a booming birthrate complicating the problem. Right now, 85% of all public school buildings need major remodeling to remove health and safety hazards.

And we aren't building enough new schools to keep up with current needs, to say nothing of catching up on those we were not able to build during the war years. School construction expenditures for 1948 are estimated at $375 million – which is less than what was spent in 1939. With building costs twice as high as they were in 1939, that means we aren't even holding our own—we are falling further behind.

And now comes the rush of war babies.

IV

We must spend at least $11 billion on new schools and equipment in the next decade.

Public and elementary schools must have $6.6 billion. Equally important, another $4.4 billion must be invested in buildings and equipment in our private schools, colleges and universities if they are to meet the demands which will be made upon them. The private school and the privately endowed university are doing their full share and doing it well. The need for them is increasing.

These figures cover only rockbottom needs for educational plant and equipment. But statistics are a very restricted recorder of this crisis.

You can see it better, I'm sure, in schools not very far from your home. There are schools with leaking roofs and outdoor toilets in our greatest cities. There are schools where students still use histories and geographies copyrighted before 1920—books with no mention of World War I, the depression of the 1930's, the Russian Revolution or the rise of the dictators. There are countless schools where modern methods of visual education are completely unknown.

All of these conditions promise to get worse – promptly – as that scheduled 5 million increase in the school population gets rolling.

V

The Metropolitan Life Insurance Company does not indulge in lurid prose. It says after painstaking study of the educational crisis that:

"Unless definite measures are taken immediately . . . large numbers of American boys and girls will be deprived of an adequate education."

Currently we are deeply concerned about our military defenses. We are taking, and I think rightly, emergency measures to strengthen them. But we must regard our schools as a part of our national defense as vital as are our armed forces. This is particularly true in these times of fifth columns and ideological warfare.

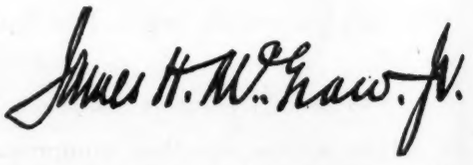
If we are wise, we will raise our sights. We will give the continuing crisis in education the same urgent attention being given the more obvious but no more real crisis in national defense.

Go to the school house in your neighborhood and discover what needs to be done to provide for the rising tide of young Americans. Ask your school board and your school administrators and teachers how you can help them.

That is good citizenship.

That is patriotism.

That is our duty to the oncoming generation.



President, McGraw-Hill Publishing Company, Inc.

FOOD INDUSTRIES

JUNE, 1948

Long-Needed Research Project

LATE in the afternoon of December 26, 1946, the outbreak of foot-and-mouth disease in Mexico was confirmed. Within an hour the U.S. Secretary of Agriculture ordered the U.S.-Mexican border closed to the importation of cattle and other susceptible animals. In January, plans were in the making for an official joint organization to fight the disease. On February 28, Congress and the President gave the necessary authority to conduct large-scale operations in Mexico to combat the spread of the disease.

A Very Serious Situation

If a military invasion had threatened, the government could not have acted with much greater dispatch. Which is ample testimony to the seriousness of the threat to the livestock and food industries of the United States. The foot-and-mouth disease is much more than a problem of the range country. It is an equally serious threat to the dairy industry of Wisconsin, the Northeast, and the West Coast. It is a threat to hog producers of the Corn Belt, to the cattle feeders of the Midwest—in fact, to every farmer in each of the 48 states who owns a cloven-hoofed animal. Which means, then, that it could also bring disaster to large segments of the food processing and allied industries.

Fortunately, the campaign against the disease in Mexico—however much it has been criticized—has up to this writing prevented any outbreak in the United States. From the viewpoint of livestock growers and meat packers in the United States, then, the campaign has been successful. But if you talk to Mexicans whose animals were slaughtered, and to Mexicans who like meat and dairy products, you would find that all is not serene. In fact, when the slaughter program reached a rate of 28,000 cattle and 30,000 small animals in one week last fall, mounting tension caused a change in the program. It was then that buffer zones were established within the northern and southern quarantine lines. Movement of susceptible animals within these zones was restricted, and repeated inspection of the animals conducted. Infected premises within the buffer zones or in free areas were quarantined and infected animals slaughtered and buried.

Vaccination of susceptible animals in the buffer zones is part of the revised plan. There is a shortage of vaccines, however, as they must be purchased abroad and tested under Mexican conditions. In spite of the fact that the foot-and-mouth disease has been a threat to our livestock for many years, we had not developed vaccines in this country. Why? Because research involving live virus would have been strongly objected to by the livestock industry. So this important work was left to laboratories in Europe, South America and elsewhere.

Isolated Research Authorized

But the Mexican scare has now effected a change of attitude. On April 24, President Truman signed a bill authorizing the government to set up a laboratory to study the foot-and-mouth disease. Unfortunately from some respects, this law specifies that the laboratory be located on some island separated from the mainland by deep sea navigation. This will make effective research more difficult. It will not be easy to recruit personnel nor to keep them and their families happy. Consultation with other scientific institutions will be impeded. The environment of the animals used in the work may not be the same as on the mainland.

However, if the laboratory must be isolated, then it is to be hoped that it is established and staffed quickly before our luck runs out.

F K Lawler

EXECUTIVE EDITOR

The Talk of the Industry

• THERE is no reason to believe that Congress is going to adopt any blanket deferment for scientific and engineering personnel. Suggestions of the military to the Congress indicated a feeling that such deferments ought to be more generous in the new draft law than they were during World War II. But in an election year there is no expectation of a substitution of exemption by class for the older deferment program in which each individual case is considered at the local board level.

• SOME food processors are bedeviled by a 6c. retail price on a nickel item, such as a bottled beverage or a candy bar. Others are in an unhappy squeeze between the old nickel price and greatly increased manufacturing and distribution costs. If you are in either situation, you may champion the cause of Edward W. Mehren, president of the Squirt Co., Beverly Hills, Cal., which makes a grapefruit drink.

Mr. Mehren has been extolling the advantages of a 7½c. coin. He also believes the mint should turn out 2½c. and 12½c. pieces. The latter might save 2½c. on a 10c. glass of beer where the charge is now 15c.

The basic idea is to give a fair deal all around — higher prices where needed, lower prices where feasible, and a convenient coin for all occasions. Mr. Mehren believes that, all prices considered, consumers would save money.

There are a few obstacles, however, such as cash registers which cannot ring up a fractional-cent sale. So don't count your 7½c. coins before they are minted.

• WAR ASSETS Administration recently called for sealed bids on 15 carloads of sour pickles. Wonder if they were still crisp?

• Two New Jersey physicians are reported to have discovered a solution having remarkable properties. Flowers dipped into the solution will not wilt or fade for years, so 'tis said. If the discovery is "real" and not a phoney, and if it ruins the florists of the country, the canners and freezers may have something more to worry about.

• GROCERY Manufacturers of America is spreading a good word for DDT in distribution channels in an effort to curtail insect infestation of cereal products after they leave the factory. Three incentives are utilized to get grocers interested—save food which is vital to world peace, protect profits, and avoid driving customers away. If the campaign clicks, manufacturers of cereal products won't have to take so much blame from consumers for bugs which are beyond their control.

• AN interesting achievement is reported by *Tupco News*—house organ of Tuc Co. which developed the new process of "cremogenization" of sweet corn. Sub-grade cream-style frozen corn from Utah (packed several years ago) was combined with a better grade of frozen kernel corn from Washington. To this was added frozen white and green limas from New York. Then the whole was canned as cream corn succotash during the winter months at a profit claimed to be more than $1,000 a day. Well, that's one way to get rid of low-quality frozen vegetables. But how did the freezers come out?

• FOR a time housewives were puzzled by the fact that they could not buy the familiar yeast cake. Instead, their grocers offered them a little package of dry yeast. Now the Fleischmann ads tell why. "Old-time perishable yeast is out, and the new yeast which needs no refrigeration is in. The new yeast can be bought in large quantities and kept for weeks on the pantry shelf. New yeast will always be on hand, full strength. Every woman who bakes will benefit by it."

We suspect that the manufacturer will benefit, too, by virtue of the lower cost involved in marketing a non-perishable item. So everyone should be happy.

• BREWERS were just about ready to adopt a grain-saving program under the first voluntary agreement drafted by the U. S. Department of Agriculture. Then they discovered that the distilleries were refusing to go along with such a plan. Naturally the beer makers did not want to be the only conservation army. Secretary of Agriculture Anderson saw the point and postponed the brewers' agreement for 45 days. It looks as though the secretary were going to have as much trouble getting grain saving as Mr. Luckman did with chickenless-eggless Thursdays.

• Had you forgotten all about "Meatless Tuesdays"?

We were forcibly reminded of it recently at Swift & Co's. dining room. That nice juicy steak on a Tuesday turned into a chicken.

Hors d'Oeuvres

• And so now USDA finds that wild oats may help in developing rust resistant varieties of cultivated oats. Their more renowned use was good enough for most of us.

• Furthermore scientists know that wild oats have been in California since before 1800. Hollywood, apparently, is just a recent manifestation.

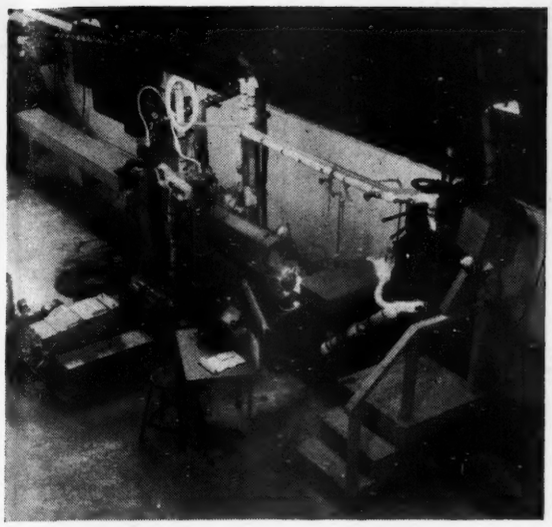
• The rose leaf jelly, mentioned here in March, reminds a reader in Lancaster, Pa., that his sister produced the stuff, non-commercially, way back in 1902. And adding to our selection of red, white and pink, he also slides in a hint that there are yellow roses, too. But we aren't the kind of people who would snitch on a flower using butter's private color.

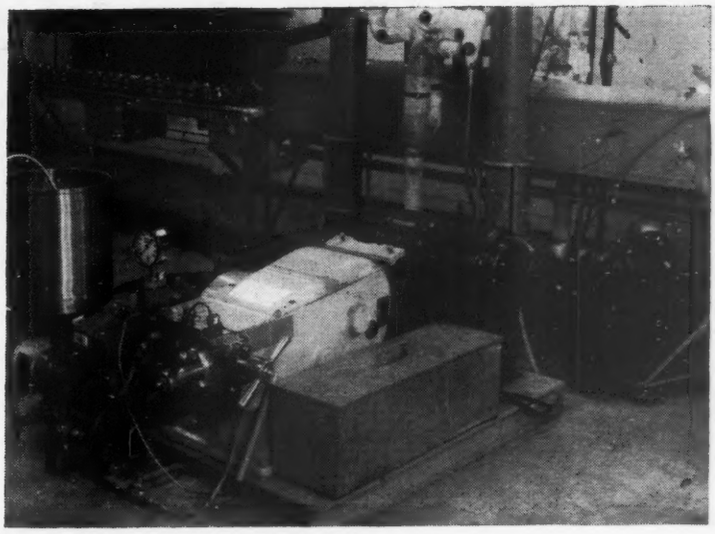
• Did you know that the "powerful business beam of the nation's food spotlight was focusing on cottage cheese and cream cheese with peaches," during April and May. That's what the American Dairy Association said was happening. There were also such diversions as Presidential jockeying, war or no war, Russia, ERP, and the opening of the baseball season.

• The organizer of the Piggly Wiggly chain lost control trying to resist a bear raid in 1923. Then he organized the Clarence Saunders-Sole-Owner-of-My-Name stores, which went bankrupt in 1931. Now he is starting the Keedoozle chain down in Memphis. We think this marks a trend toward conservatism, but we can't be sure.

• Development of a noiseless popcorn package for movie goers is a definite advance. But it still leaves a lot of decibels to be taken out of the crunch.

• Down in Virginia a cow lost all appetite when sold by the man who had raised her. Brought back, she galloped (it says here) into her pen and cleaned out the feed box. And she has been giving an extra gallon of milk daily, ever since. Her owner is president of a water company. J.A.J.J.





PILOT equipment (left) has a capacity of 60 cans per minute. Closeup (right) shows product sterilization system, including supply tank and pumps, foreground, and tubular heat exchangers, background. Cans and seaming head are sterilized with superheated steam.

Flash Process, Aseptic Fill, Are Used in New Canning Unit

Fluid products are given short high-temperature sterilization, then filled into sterilized cans in new process of canning carried successfully through pilot plant stage. The equipment has passed severe bacteriological tests

By W. M. MARTIN, Director of Research & Development
The Schwarz Engineering Co., Inc., Redwood City, Cal.

COMBINATION of the principles of short high-temperature sterilization with those of the aseptic canning process has the important advantage of producing the best possible quality of finished canned goods in the fluid-products line.

It is desirable for commercial use, however, to carry out these operations with relatively simple equipment. Such equipment has now been developed, and has been tested under conditions more severe than are likely to be encountered in commercial canning operations. Results indicate the method to be both practical and dependable.

Particular advantage is seen with heavy or viscous type products, which are difficult to sterilize in sealed containers without adversely affecting quality. The process will be especially important in packing such products in large size containers for the institutional trade.

The most promising applications for the immediate future would seem to be in packing canned chocolate milk, baby foods, fruit juices and purees, vegetables juices and purees (for soup stocks), cream soups (especially cream soups with milk base), dessert puddings, canned ice cream mixes, evaporated milk and other liquiform products. The commercial possibilities of the process for the above and other specialty items are evident.

New Impetus for Canning

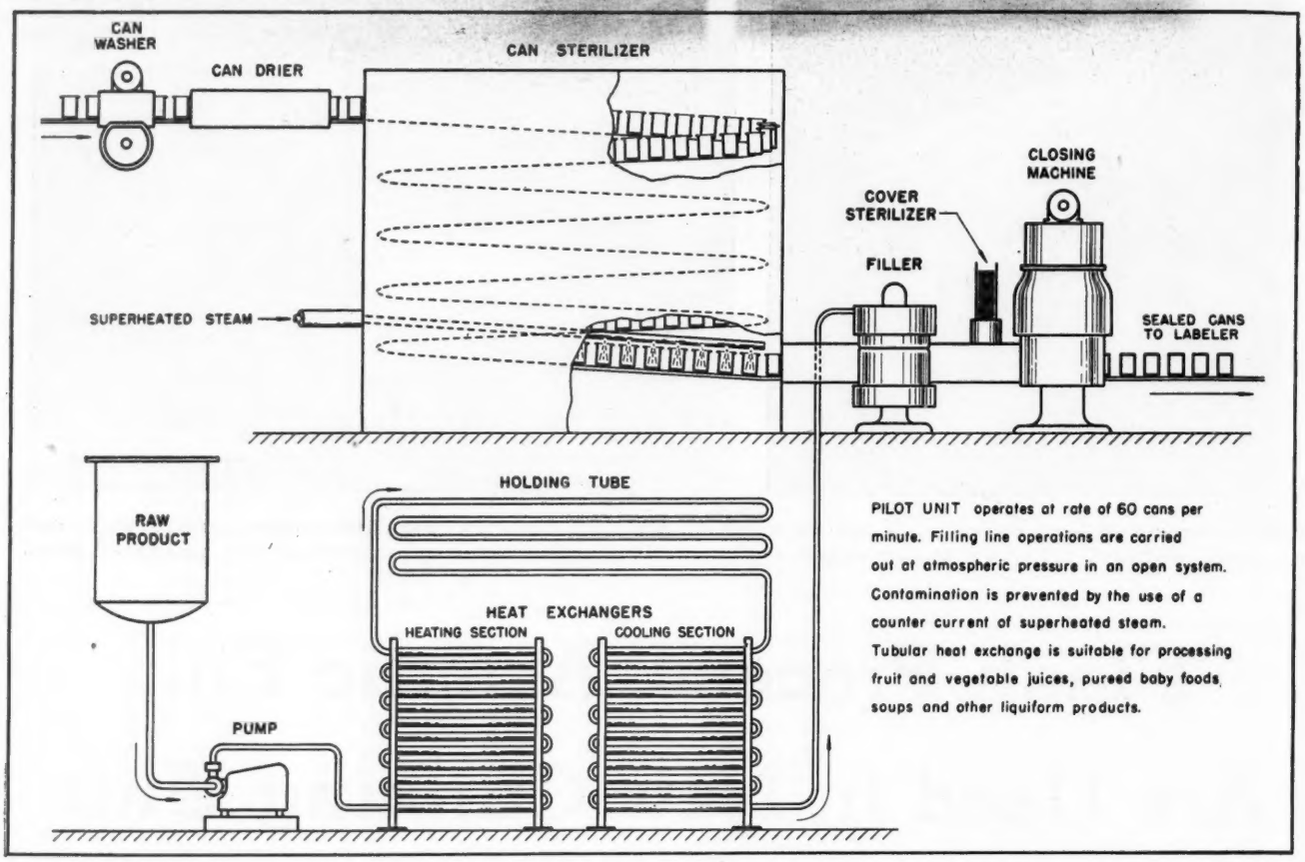
Aseptic canning processes appear to be approaching the point of general acceptance and regular commercial use. The process described in this article is claimed to meet the strict requirements of the California pure food laws. A full scale commercial trial is planned for later this year. The results of this test will be watched with interest by canners who wish to evaluate the commercial feasibility of the process. Short high-temperature processing, with aseptic filling, may give some kinds of canned goods new impetus in the race with frozen or prepackaged fresh products.—The Editors.

Let us first consider the background of the short-time, high temperature method:

In the thermal sterilization of canned foods, it has been observed by Ball [1] and others [3, 5] that a short process at high temperature generally produces a finished product of better flavor, color and texture than an equivalent process at low temperature. It has also been shown by Feaster, et al.[4] that vitamin retention is higher in foods processed by the short high-temperature technic than in foods processed by conventional methods subjecting them to prolonged heating at low temperature.

The advantages of short high-temperature sterilization methods,

Simplicity of Design is Feature of Martin Equipment


CAN WASHER
CAN DRIER
CAN STERILIZER
CLOSING MACHINE
COVER STERILIZER
FILLER
SUPERHEATED STEAM
SEALED CANS TO LABELER
HOLDING TUBE
RAW PRODUCT
HEAT EXCHANGERS
HEATING SECTION
COOLING SECTION
PUMP
PILOT UNIT operates at rate of 60 cans per minute. Filling line operations are carried out at atmospheric pressure in an open system. Contamination is prevented by the use of a counter current of superheated steam. Tubular heat exchange is suitable for processing fruit and vegetable juices, pureed baby foods, soups and other liquiform products.

FLOW DIAGRAM shows equipment for sterilizing cans and covers and for processing raw product. Operations are continuous.

together with a review of the technical and patent literature on the subject, have been interestingly and authoritatively presented by Ball. His paper is an excellent reference which should be consulted by those interested in a detailed discussion.

On the basis of the foregoing observations it follows that the ideal process for the sterilization of canned foods would be to heat the product rapidly to the sterilization temperature, hold for the shortest time necessary for complete sterilization and cool rapidly again to room temperature.

However, with the methods generally used in the canning industry, in which foods are sterilized in sealed containers, it is not only difficult to control the process in the higher temperature range, because of the short time involved, but it is also difficult—if not impossible—to obtain uniform heat penetration throughout the mass of the product without over-processing or scorching that portion in contact with the walls of the container. Because of these difficulties commercial practice has generally adhered to processes in the lower temperature range—seldom above 250 deg. F.

While the above limitations apply to solid and semi-solid products in which heat transfer is largely by conduction, they do not apply to fluid type products in which heat transfer may be accelerated by agitation during the heating and cooling operations. In the case of the latter type products—which include fruit and vegetable juices, pureed baby foods, soups and other liquiform products—short high-temperature sterilization may be accomplished with tubular heaters or plate type heat-exchangers without encountering local overheating or scorching at the heat-exchange surfaces. Such products may thus be quickly heated, cooled and discharged from the heat-exchange system in a sterile condition.

While this part of the process is quite simple—in that the product can be pumped successively through the heating, holding and cooling systems in a continuous manner without exposure to external contamination —the canning operations from this point forward are complicated by the fact that the sterile product must be filled into sterile containers and the latter sealed under aseptic conditions.

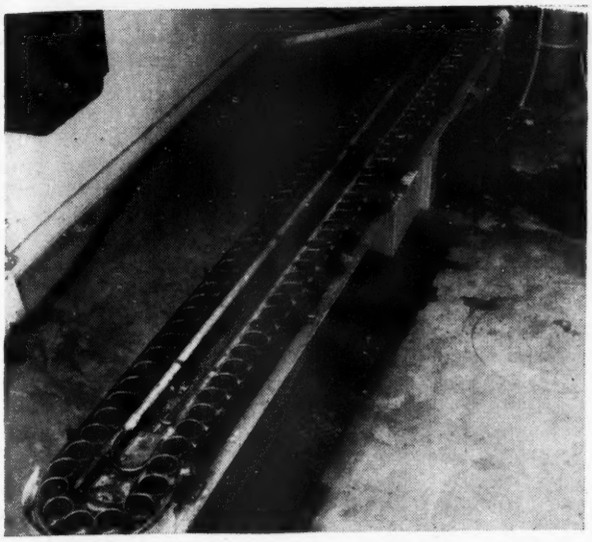
Although various methods have been proposed for the sterilization of the containers and covers and for carrying out the filling and sealing operations aseptically, apparently none of them, with the exception of that invented by Ball,[2] has been carried beyond the experimental stages of development. Without attempting to discuss the latter in detail, it will suffice to say that it was the culmination of many years of extensive experimental work the results of which, as outlined in the paper by Ball, stimulated new interest in the industry in improved methods of sterilization for canned foods.

Simple Design

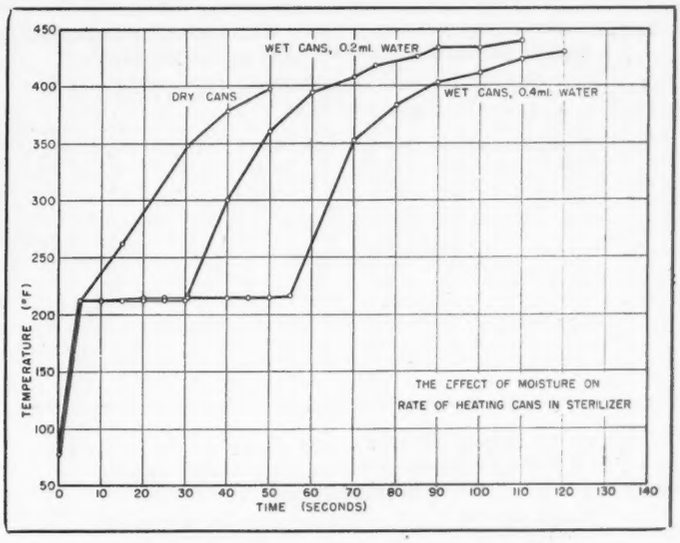
The present work was undertaken with the object of developing aseptic canning equipment of simple design for operation in conjunction with the various types of heat-exchangers currently available for the short high-temperature sterilization of fluid products. The process described in this article has been developed through the experimental and pilot plant stages, and engineering work is now in progress on the design of commercial equipment. The pilot scale equipment having a capacity of 60 cans per minute is shown in the photographs, and the principles of the process are shown schematically in the flow diagram.

Referring to the flow diagram, it will be seen that the canning pro-

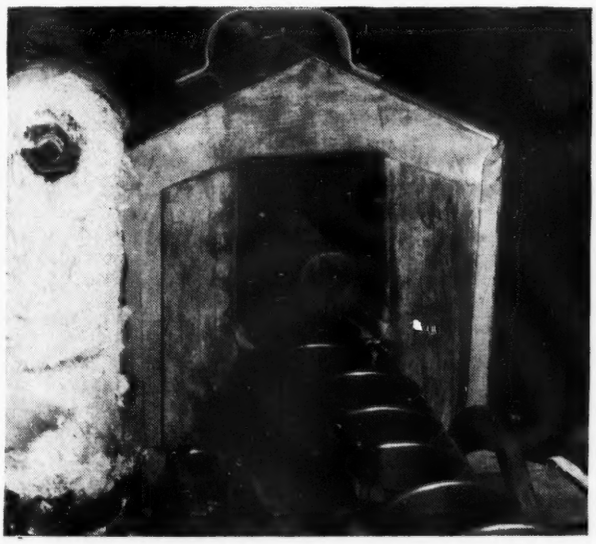
Cans and Covers Are Sterilized Without Pressurization



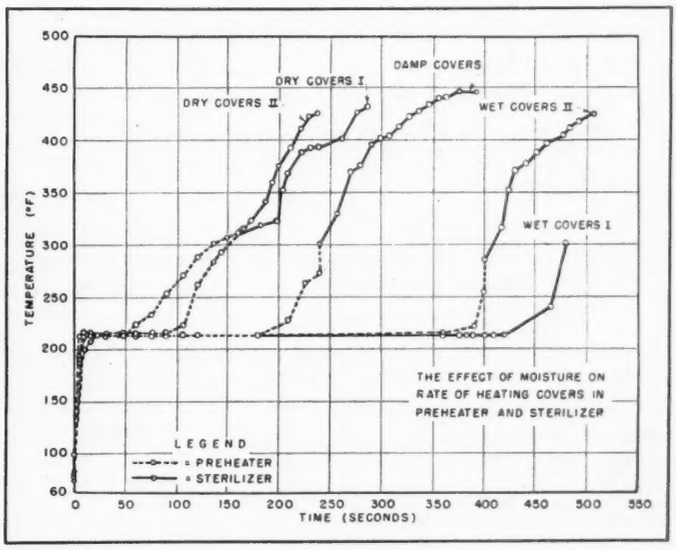
CAN DRIER and preheater shown with the cover removed.



CANS approach temperature of superheated steam in sterilizer.



CLOSEUP of cans passing from the drier into the sterilizer.



COVERS take longer to heat but approach high temperature also.

cedure consists of four separate operations which are carried out simultaneously as a continuous process. The operations are: (1) Sterilization of the product by flash-heating and cooling in a tubular type heat-exchange system, (2) sterilization of the containers and covers with superheated steam, (3) aseptic filling of the cold sterile product into the sterile containers, and (4) application of sterile covers to the filled containers and sealing the same in an atmosphere of either saturated or superheated steam.

Contamination Controlled

The sterilization of the product is accomplished by pumping it continuously through the heat-exchange system and delivering it to the filler without exposure to the air or other external sources of contamination. The empty containers enter the system by a conventional cable conveyor, passing through the washer and drier before entering the sterilizer. In the latter, the containers are subjected to the action of superheated steam at a sufficiently high temperature and for sufficient time to effect complete sterilization.

Temperature of the superheated steam is regulated thermostatically, and the time of exposure in the sterilizer is controlled by the speed of the conveyor cable carrying the containers through the system. The containers thus sterilized are conveyed continuously to the filler from which they pass directly to the closing machine where they receive sterile covers. The latter are sterilized with superheated steam in a special apparatus built into the cover feed of the closing machine.

All of the operations involved in the sterilization, filling and sealing of the containers are carried out at atmospheric pressure in an open system. The outward flow of superheated steam effectively prevents airborne bacteria from entering the system through either the entrance, exit, or through other openings in the equipment. This counter-current principle not only obviates the necessity of mechanical valves for passing the empty containers and covers in, and the sealed containers out, of the system, but it also eliminates the necessity of pressurized construction in the equipment.

Sterilization Tests

Cans and covers were inoculated with spores of heat-resistant bacteria, allowed to dry for 24 hr., and then passed through the aseptic canning machine at various speeds so as to control the sterilization times. The cans thus sterilized were packed

Contaminated Cans, Covers, Equipment Effectively Sterilized

TABLE I—STERILIZATION OF CANS AND COVERS Inoculated with Organism N.C.A.-3679 (30,000 spores per can).

Code	Sterilization: Cans Time Sec.	Cans Temp. °F.	Covers Time Sec.	Covers Temp.** °F.	Incubation of samples at 87° F. (Percent swells): 15 Days %	32 Days %	65 Days %	152 Days %	292 Days %
6	120	457	10	385	0	0	0	0	0
7A	120	457	10	386	0	0	0	0	0
8A	60	432	10	389	0	0	0	0	0
9A	30	300	10	388	5.0	12.5	15.0	17.5	17.5
10B	120	455	15	386	0	0	0	0	0
11B	120	452	30	369	0	0	0	0	0
12B	120	451	45	359	0	0	0	0	0
13A	—	—	10	358	95.0	100.0	—	—	—

* Code: A = Cans inoculated; B = Covers inoculated.

** Average values for temperatures recorded by three thermocouples mounted between superheated steam jets and covers.

TABLE II—EFFECT OF PREHEATING on the Sterilization of Cans and Covers Inoculated with Organism N.C.A. -3679

(20,000 spores per can or cover)

Code *	Sterilization: Cans Time Sec.	Cans Temp. °F.	Covers Time Sec.	Covers Temp.** °F.	Incubation of samples at 87° F. (Percent swells): 14 Days %	29 Days %	59 Days %	116 Days %	256 Days %
14A	15	265	10	385	93.8	100.0	—	—	—
15AH	15	368	10	378	93.8	93.8	100.0	—	—
16A	30	362	10	383	100.0	—	—	—	—
17AH	30	415	10	381	18.8	59.4	75.0	78.1	87.5
18A	45	425	10	382	0	0	0	0	0
19AH	45	455	10	381	0	0	0	0	0
20B	45	424	3	358	100.0	—	—	—	—
21BY	45	428	3	366	46.1	61.5	69.2	76.9	76.9
22B	45	432	6	369	45.0	67.5	75.0	77.5	77.5
23BY	45	437	6	367	0	0	0	0	0
24B	45	439	9	374	0	0	0	5.0	5.0
25BY	45	434	9	383	0	0	0	0	0
26B	45	435	12	387	0	0	0	0	0
27BY	45	431	12	396	0	0	0	0	0
28A	0	—	10	390	100.0	—	—	—	—
29B	45	434	0	—	100.0	—	—	—	—
30A	45	425	10	381	0	0	2.5	5.0	10.0
31AW	45	425	10	381	17.5	30.0	47.5	52.5	55.0

*Code: A = cans inoculated; B = covers inoculated; H = cans preheated; Y = covers preheated; W = 0.2 ml. water added to cans.

** Average values for temperatures recorded by three thermocouples mounted between superheated steam jets and covers.

Note: Cans in codes 30A and 31AW were run alternately, hence wet cans in latter lot exerted a cooling effect on both lots.

TABLE III—SEAMING HEAD INOCULATED with Organism N.C.A.-3679 and Sterilized with Superheated Steam

(340 million spores)*

Code	Sterilization of seaming head: Time Min.	Temp. °F	Incubation of samples at 87° F. (Percent swells): 7 Days %	14 Days %	21 Days %	40 Days %	68 Days %	119 Days %
107	—	—	30.00	100.0	—	—	—	—
108	0	198	0	14.6	18.7	35.4	39.6	39.6
109	15	257	0	2.1	2.1	4.2	6.3	6.3
110	30	260	0	0	0	0	0	0
111	45	258	0	0	0	0	0	0
112	60	271	0	0	0	0	0	0
113	75	282	0	0	0	0	0	0

* Spore suspension containing 5% cane sugar as adhesive sprayed into seaming head and allowed to dry 24 hr. (3 spray applications).

TABLE IV

STERILIZATION OF CANS Inoculated with Organism N.C.A.-1518**

(10,000 spores per can)

Code *	Sterilization: Cans Time Sec.	Cans Temp. °F.	Covers Time Sec.	Covers Temp. °F.	Incubation of samples at 131° F. (swells) %
36H	20	341	60	360	33.3
37A	20	278	60	360	95.8
38AH	20	340	60	360	100.0
39H	40	400	60	360	4.2
40A	40	382	60	360	93.8
41AH	40	400	60	360	12.5
42H	60	435	84	375	0
43A	60	430	84	375	0
44AH	60	435	84	375	0
45H	80	440	111	380	0
46A	80	440	111	380	0
47AH	80	440	111	380	2.1
48BH	40	400	60	360	0

* Code: A = cans inoculated; B = covers inoculated; H = cans preheated.

** Cans inadvertently cross-inoculated with organisms from lots recorded in Tables V and VII through action of ants attracted by sugar added to inoculum as an adhesive.

TABLE V

STERILIZATION OF CANS Inoculated with Organism N.C.A.-3679**

(10,000 spores per can)

Code *	Sterilization: Cans Time Sec.	Cans Temp. °F.	Covers Time Sec.	Covers Temp. °F.	Incubation of samples at 87° F. (swells) %
60A	20	280	60	360	100.0
61AH	20	340	60	360	100.0
62A	40	380	60	360	14.6
63AH	40	390	60	360	2.1
64A	60	430	84	375	0
65AH	60	435	84	375	0
66A	80	440	111	380	0
67AH	80	440	111	380	0
68B	40	390	60	360	8.3

* Code: A = cans inoculated; B = covers inoculated; H = cans preheated.

** Cans inadvertently cross-inoculated with organisms from lots recorded in Tables IV and VII through action by ants attracted by sugar added to inoculum as an adhesive.

TABLE VI

EFFECT OF PRE-COOLING COVERS to Subnormal Temperatures on Sterilization (condensate effect)

Covers inoculated with 10,000 spores of organism N.C.A.-3679, allowed to dry, stored 18 hours at 12° F., and sterilized 60 seconds at various temperatures

Code *	Temperature of superheated steam entering cover sterilizer °F.	Incubation of samples at 87° F. (percent swells): 16 Days	35 Days	54 Days
126	467	0	0	0
126A	473	0	0	0
127	504	0	0	0
127A	501	0	0	0
128	451	0	0	0
128A	—	0	0	0
129	421	0	0	0
129A	420	0	0	0
130	400	0	0	0
130A	401	0	0	4.2
131	376	0	4.2	12.5
131A	374	0	12.5	12.5

* Code: A = covers precooled to 12° F.

Acknowledgment

An expression of appreciation is due the National Canners Assoc., San Francisco, and the Hooper Foundation of the University of California for supplying the bacterial cultures used in the inoculated can experiments, and for assistance received in carrying out some of the incubation tests on canned samples. The writer wishes especially to thank Mr. C. T. Townsend, who is a member of the research staffs of both of the above institutions, for his assistance in the work, and for many valuable suggestions in connection with the bacteriological studies.

TABLE VII

STERILIZATION OF CANS Inoculated with Non-sporulating Bacteria**

Code *	Sterilization: Cans Time Sec.	Cans Temp. °F.	Covers Time Sec.	Covers Temp. °F.	Incubation of samples at 87° F. (swells) %
50A	20	278	60	360	72.9
51AH	20	340	60	360	39.6
52A	40	382	60	360	20.8
53AH	40	390	60	360	0
54A	60	430	84	375	0
55AH	60	435	84	375	0
56A	80	440	111	380	0
57AH	80	440	111	380	0
58B	40	390	60	360	0

* Code: A = cans inoculated; B = covers inoculated; H = cans preheated.

** Cans inadvertently cross-inoculated with spores from lots recorded in Tables IV and V through action of ants attracted by sugar added to inoculum as an adhesive.

TABLE VIII

EFFECT OF OIL FILM ON Sterilization of Cans

Cans inoculated with 10,000 spores of organism N.C.A.-1518, allowed to dry 24 hours, coated with film of hydrocarbon oil and packed with nutrient broth

Code *	Sterilization: Cans Time Sec.	Cans Temp. °F.	Covers Time Sec.	Covers Temp. °F.	Incubation of samples at 131° F. (swells) %
70	20	340	60	360	100.0
71X	20	340	60	360	93.8
72	40	390	60	360	2.1
73X	40	390	60	360	0
74	60	430	84	375	0
75X	60	430	84	375	0
76	80	440	111	380	0
77X	80	440	111	380	0
87	—	—	—	—	100.0

* Code: X = Cans sprayed with oil (2 mg. per can).

with nutrient broths which were prepared in accordance with formulas in general use for the specific organisms, and the sterilization treatment given the broths in the canning process was sufficient for complete sterilization. The canned samples were incubated and the spoilage determined in accordance with standard practice. Forty eight cans were included in each variable in most of the tests.

Although thermocouples were installed in various parts of the apparatus for the purpose of determining the temperatures at critical points in the process, it was not possible to measure the temperatures of the moving cans which were actually used in the tests. This information was obtained indirectly by determining the relationship existing between the temperatures recorded by the stationary thermocouples in the sterilizer and those of the moving cans by seaming a thermocouple into the folds of the bottom double seam of a can and passing it through the sterilizer along with other cans by the same procedure used in the tests. From the results thus obtained the temperatures attained by the cans in the various experiments could be estimated fairly accurately.

Temperature measurements were likewise made for covers moving through the cover sterilizer. In this case a thermocouple was brazed to the center of the cover, using as little brazing metal as possible in order to avoid the effect of mass on the heating rate.

Heating Curves

Heating curves for cans and covers, both wet and dry, were determined for the purpose of showing the effects of condensate or moisture from other sources on the sterilization treatment. The data obtained in these measurements are presented in the charts.

The sterilization tests with inoculated cans (results of which are given in Tables I to VIII inclusive) were carried out under widely differing conditions during the progress of experimental work over a period of nearly two years, hence the results are not strictly comparable. They are in general agreement, however, in showing that, with superheated steam at the temperatures prevailing in these tests, the critical sterilization time was in the range of 40-60 sec. for cans inoculated with spores of both organisms N.C.A. No. PA-3679 and N.C.A.-1518.

The temperatures given in Tables I and II for the sterilization of the covers represent average values obtained by three thermocouples mounted in the cover sterilizer, whereas the cover sterilization temperatures given in all the other tables were estimated from the heating curve data, as already explained.

Cross-inoculation of more than 1,400 cans used in the experiments (see Tables IV, V and VII) occurred as a result of the action of ants attracted by sugar which was added to the inoculum for the purpose of increasing the adhesion of the latter to the cans during the sterilization treatment. Following inoculation, the cans were spread out in the laboratory to dry overnight, during which they were invaded by ants with the resulting cross-inoculation (explained in the footnotes to the respective tables). But the results secured in the tests showed that, with the exception of one skip (Code 47AH in Table IV), no spoilage occurred in any of the cans receiving more than 40 sec. sterilization.

Effect of Oil Film

The tests on cans coated with an oil film (results recorded in Table VIII) were carried out for the purpose of determining whether such a film would protect bacterial spores against the sterilizing effect of superheated steam. Tin plate as received by the can manufacturer normally carries a film of palm oil or other oil, and it was thought that this might present a problem in sterilization. The results of the inoculation tests show that the oil had no significant effect on sterilization.

Other data (Table VI) were obtained in anticipation of conditions which might be encountered in using cans and covers stored at subnormal temperatures—as, for example, covers brought into the canning plant from freight cars during sub-zero weather. In making these tests it was not possible to vary the cover sterilization time with the pilot equipment because the closing machine and accessory cover sterilizer were designed for operating at a fixed speed. The temperature of the superheated steam supplied to the cover sterilizer was therefore varied within the range of 375-500 deg. F. and experimental packs made with both pre-cooled and uncooled covers at the temperatures shown in the table.

Results of the incubation tests on the samples show that precooling of the covers had a slight effect on sterilization, hence this factor should be considered when operating at subnormal temperatures.

The problem of sterilizing the seaming head of the closing machine and maintaining it in a sterile condition during operation has received constant attention during the course of more than two years of experimental work. Although no difficulties were encountered during that time, tests were carried out (see Table III) for the purpose of determining the possibilities of trouble from this source under adverse conditions.

As shown by the results of incubation tests given in the table, the sterilization of the seaming head presents no serious problem. Even with the severe test used in this experiment, sterilization of the seaming head was completed in less than 30 min. Probably 20 min. are adequate for sterilization under the most severe conditions which are likely to be encountered under commercial operating conditions.

Summary

For heavy or viscous type products, which are difficult to sterilize in sealed containers without affecting quality adversely, the use of short high-temperature sterilization in combination with aseptic canning principles will be found particularly advantageous.

The present process has been subjected to a series of tests under conditions more severe than are likely to be encountered in commercial canning operations, and the results of the tests indicate that it is both practical and dependable in its performance.

The process lends itself to continuous operation and thus permits "streamlining" of factory layout in accordance with the modern trend.

References

1. Ball, C. O.: Advancement in Sterilization Methods for Canned Foods. *Food Research*, vol. 3, Nos. 1 and 2, Jan.-Feb., March-April, 1938.
2. Ball, C. O.: Apparatus for and Method of Canning, U. S. Patent No. 2,029,303. Feb. 4, 1936. Assigned to American Can Co.
3. Courtis, J. W.: Small Tube Heat-Exchangers Offer Many Advantages. *Food Industries*, Sept., 1943.
4. Feaster, J. F., Tompkins, M. D. and Ives, M.; Retention of Vitamins in Low Acid Canned Foods. *Food Industries*, Jan., 1948.
5. Wood, C. S.: Mallorization—What It Is and What It Can Do for the Milk Industry. *The Milk Dealer*, Oct., 1946.

A general report on his experimental work was given by the author at the food processors' conference early this year at the University of California.

He Proposes . . .

Paul S. Willis stumps for inclusion of more processed foods for recovery program.

. . . They Dispose . . .

Paul G. Hoffman, ECA administrator and W. Averell Harriman, roving ambassador, must weigh the determining factors in choosing foods to supplement Europe's diet.

ERP Should Include

Economics, health, morale, and political considerations are cited

By PAUL S. WILLIS, President, Grocery Manufacturers of America

GROCERY manufacturers are of the opinion that processed foods should have a much more important place in the European Recovery Program — for four major reasons:

1. Inclusion of greater quantities of processed goods in food shipments abroad would provide the European recipients with a more varied diet, which can result in the development of a higher morale and stronger and healthier people.

2. Exports to Europe of various processed foods from the United States would assure the maintenance of peak food production and food industry employment, which is necessary to the industrial mobilization and national preparedness programs now being effected as a result of the uncertain international situation.

3. Export of less grain and more processed foods would alleviate the uneven pressure upon our food price structure and bring about a much better balance between supply and demand in the overall food picture.

4. Shipment of American trade-marked foods to Europe would tend to impress upon the Europeans that the food is sent to them from the United States and will also enable manufacturers to gain brand recognition, thus paving the way for the building of private trade export markets.

Offset Objections

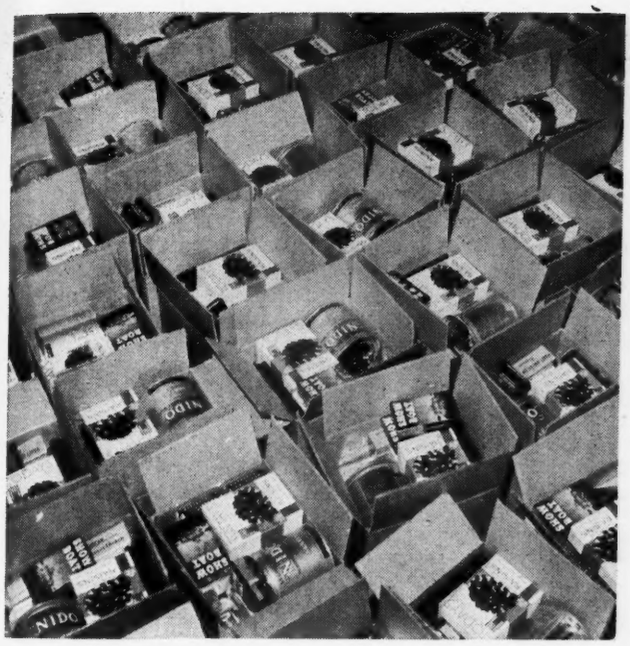
Grocery Manufacturers of America, Inc., believes that these reasons more than offset past objections to the export of processed foods, particularly canned goods, for relief feeding. Accordingly, we have advised the Department of Agriculture of our desire to see more processed foods in relief shipments and are planning to place facts and figures, backing up our thinking, before the Economic Cooperation Administration, of which Paul G. Hoffman is administrator.

We are hopeful that favorable action will be taken in time to prevent any drastic reductions in 1948-49 packs of fruits and vegetables, which are now in plentiful supply and of which there will probably be substantial carryovers if they are not utilized for relief feeding. Such items include canned citrus juices, grapefruit segments, lower grade peas, pumpkin, sweet potatoes, tomato juice, peanut butter, jams and jellies, honey, dried prunes, raisins, peaches and figs.

It is not difficult to imagine the joy with which most Europeans would greet the arrival and distribution of such palate-pleasing foods.

The grocery manufacturing industry is also urging the shipment of larger quantities of processed flour and lesser quantities of wheat to be milled into flour abroad. The milling of wheat into flour here in the United States provides employment to American labor and results in the retention in the U.S. of wheat by-product feed, which replaces more than an equivalent quantity of grain for animal feeding purposes.

Further, in order to mill wheat under present conditions abroad it is necessary for the European miller to also get from the United States fuel and other materials to operate the mills, and bagging material in which to pack the flour. It is also



...On Types Of Foods For Europe

As with all other materials, decisions on food must be considered in relation to many factors, economic and political, on both sides of the Atlantic. Up to now, processed foods have played only a small part in the program, due largely to their bulk and higher cost.

More Packaged Foods

to support a broader U.S. food policy for the recovery program

true that flour can be distributed efficiently and used immediately, whereas wheat requires transportation from ship to mill after which the flour must be transported to points of consumption. This imposes an additional burden on wartorn transportation facilities in the European countries.

Let us now go into detail concerning our four reasons:

Good Diet

Grocery manufacturers make no pretense of being great world humanitarians in advocating a more diversified diet for the European people. However, we do know the value of good eating, both to the building of morale and the strengthening of bodies, and therefore can foresee that the time needed for European recovery hinges upon the will to work, and the ability to work, of the men and women who must supply the labor necessary to the rebuilding of their countries.

Anything that we can do to improve the morale of those people and give them the strength to go out and do a real day's work will obviously hasten the day when the United States economy will settle down to a more normal level and the taxpayer will be relieved of the financial burden imposed upon him by the cost of the European Recovery Program.

Our reason for urging that more processed foods be purchased by the government for overseas relief feeding is simply that it does not seem advisable at this point in world history to allow a cut-back in American food production. If the international situation is deteriorating to a crisis stage, as claimed by some observers, it doesn't seem wise to curtail production of processed foods, which are not perishable and can be stockpiled for future use or utilized immediately for relief feeding.

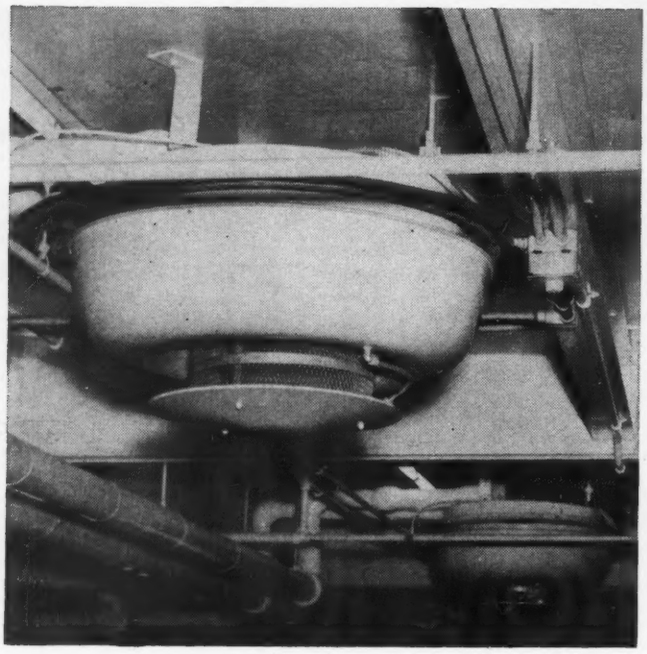
There is a great stress today upon the urgent need for national preparedness and industrial mobilization. We do not believe that preparedness means idle machines or reduced production of food products that are essential to both a peacetime and wartime economy. Neither do we believe that national preparedness can tolerate the wasting of vital resources. A few food processing plants have already shut down on a temporary basis because they have processed more than they can sell at the moment. With the new crop season coming up, these heavy inventories could cause hesitation regarding capacity operation of plants at the height of the season. If bumper crops of vegetables and other foods are realized this year, a curtailed processing schedule could conceivably mean a waste of part of the crops.

With hunger existing abroad and the ERP designed in part to relieve that hunger it doesn't seem like either humanitarianism or sound economics to permit waste and spoilage of foods and the piling up of surpluses here when such foods can be used abroad.

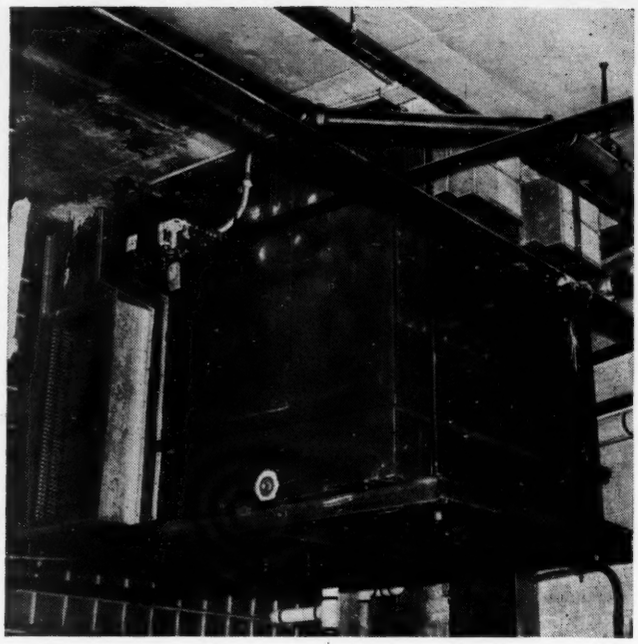
Public Interest

Most American people are aware of the effects of past relief food shipments upon our national economy, particularly with regard to the prices they have been paying for some foods. Huge shipments of wheat and other grains in the past few years have created a shortened supply here at home and the law of

(*Continued on page 208*)



CEILING-mounted cooling units use chilled water to cool air. Under thermostat control, each units has fan driven by a 1/3 hp. motor.



TRIETHYLENE glycol dehumidifying unit handles all incoming ventilation. Air is filtered and passed through a glycol spray.

Glycol System Cuts Air

Glycol is reactivated by use of exhaust steam from conventional

By BYRON A. ENGELBACH, Plant Engineer
New England Confectionery Co., Cambridge, Mass.

OPERATIONAL savings, far above those possible with conventional installations have been effected by the recent air conditioning system installed in the New England Confectionery Co. plant at Cambridge, Mass. It is a ductless system embodying separate temperature and relative humidity control, elimination of reheating after moisture removal and reuse of steam through a balanced steam control. An added feature at no additional cost is the sterilizing qualities of triethylene glycol used as the liquid sorbent in the system.

Original System Overloaded

Air conditioning is an important factor in the manufacture of confectionery products. Changes in temperature and relative humidity affect the end product to a far greater extent than is generally realized. The industry itself has been cognizant of the need of conditioning for many years. Existing installations have been pushed for greater tonnage output, and in some cases considerably beyond the capacities for which they were originally designed.

Through the years, the original air conditioning system at the Necco plant has been altered to meet ever increasing demands due to an expanding business. The conventional-type system with ducts, air washers, and cooling coils serving areas requiring conditioning for production purposes only, gradually reached a point of overload. Centrifugal turbine driven compressors for cooling the brine and chilled water were operating beyond rated capacities with resulting increased operating cost due to efficiency losses.

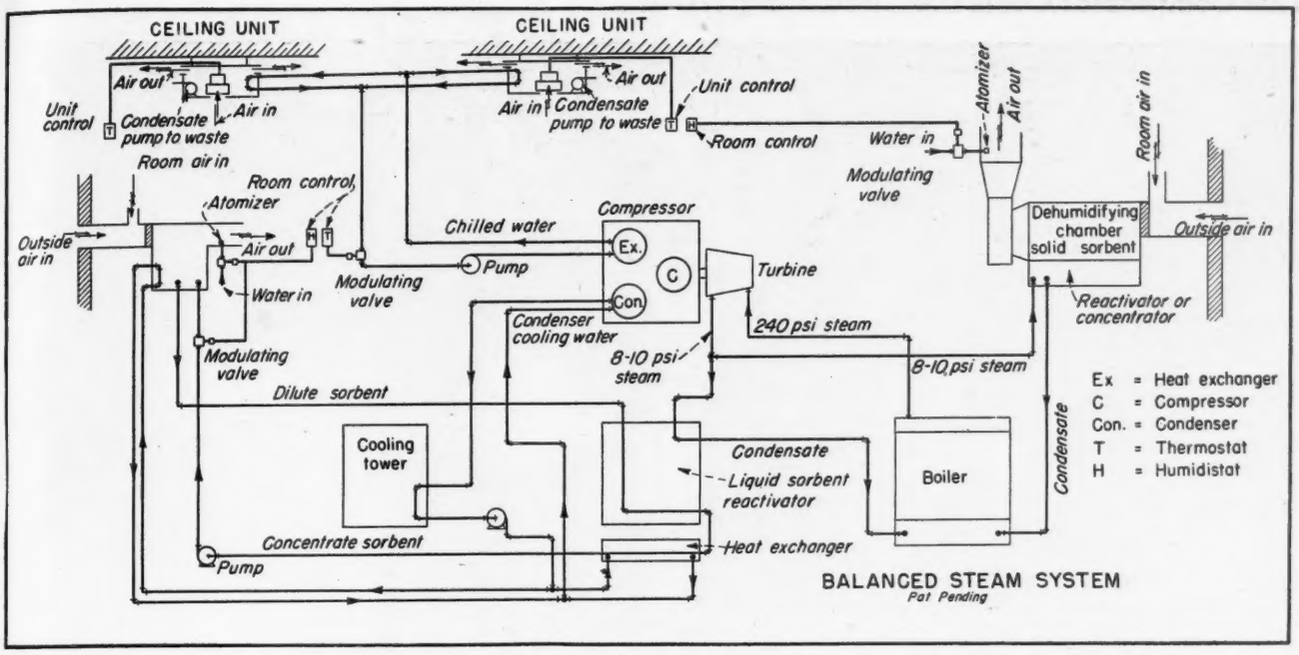
When plans for an extensive modernization program developed on the drawing boards, it became apparent that the present air conditioning equipment was not only inadequate, but that a major project was involved in readapting the system as a whole. The plans called for increased processing loads, and in addition comfort conditioning had to be carried on the system.

At this point it was decided to secure the services of a specialized consulting engineer. In addition to meeting the load demands, some of the goals given to the consultant to strive for were:

1. A ductless system, eliminating unsightly and unclean air ducts.
2. A system which could be altered to meet varying loads or area changes with the least trouble and at a minimum cost.
3. Filtered air in all production and comfort zones.
4. Elimination of drafts.
5. Separate temperature and relative humidity control.
6. A more economical operating cost.
7. Elimination of waste steam in the power plant from turbine driven compressors.

Made Studies

It is unnecessary to detail the progress of the consultant and the Necco staff engineers and draftsmen assigned to the work. The submitted report indicated a theoretical air conditioning load increase of approximately 100 per cent over the available facilities. Several solutions to the problem were presented along with estimated costs for equipment, alterations and operation. These varied from the conventional-type system to the ultra-modern system finally approved.



BALANCED steam diagram shows how liquid sorbent reactivator ties in steam and sorbent returning each to its system for reuse.

Ceiling-mounted units under thermostat control carry sensible load. Absorber, using glycol, under humidistat, carries latent load.

Conditioning Costs 40%

turbine driven refrigeration compressor in a balanced dual system

For purposes of clarification, and to eliminate confusion, this system will be referred to as the Cummings System, in view of the fact that Mr. Warren Cummings, President of Controldaire International, Inc., conceived and engineered the installation in cooperation with the Necco engineering staff.

System Adopted

Actually, the Cummings System is not basically new. It does, however, incorporate the newest-type equipment, and a new and novel control system for balancing the steam load used on refrigeration. The major heat load of an area (the sensible heat load) is removed through the individual, ceiling-mounted units, which were designed and built specially for the Necco job. The coolant is chilled water supplied to an area loop from a master loop. The latent load (water vapor) removal equipment is standard units utilizing triethylene glycol as the water vapor sorbent. Exhaust steam at 9 pounds pressure from non-condensing turbines driving the compressors is used as the reactivating or concentrating agent for the triethylene glycol solution. The concentrated glycol is piped to individual units from a master loop.

Present spray pond water is used for cooling the triethylene glycol. New Coey cooling towers, installed adjacent to the power plant, supply cooling water for the compressor condensors. This arrangement results in low cost pumping charges, and minimum costs for piping installations. The ceiling cooling units and humidifiers were built for Necco use under special patent licensing through the courtesy of Mr. Cummings. A new 250-ton centrifugal compressor with non-condensing turbine drive was installed in the engine room.

Designed Loading and Operation

The original 330-ton air conditioning load jumped to some 900 tons due to the modernization plans. The new 250-ton compressor will take part of the additional load, and the remaining 320 tons will be carried on the triethylene glycol units. The above statement deserves clarification.

Let us assume that the latent heat load is 50 percent of the designed peak latent load. Therefore, only 50 percent of the designed capacity of the absorber is needed to reduce the moisture in the area to the designed relative humidity, which is reflected by the standard humidistat. When the designed relative humidity is reached, atomized water spray is introduced automaticaly into the dry air stream from the absorbers.

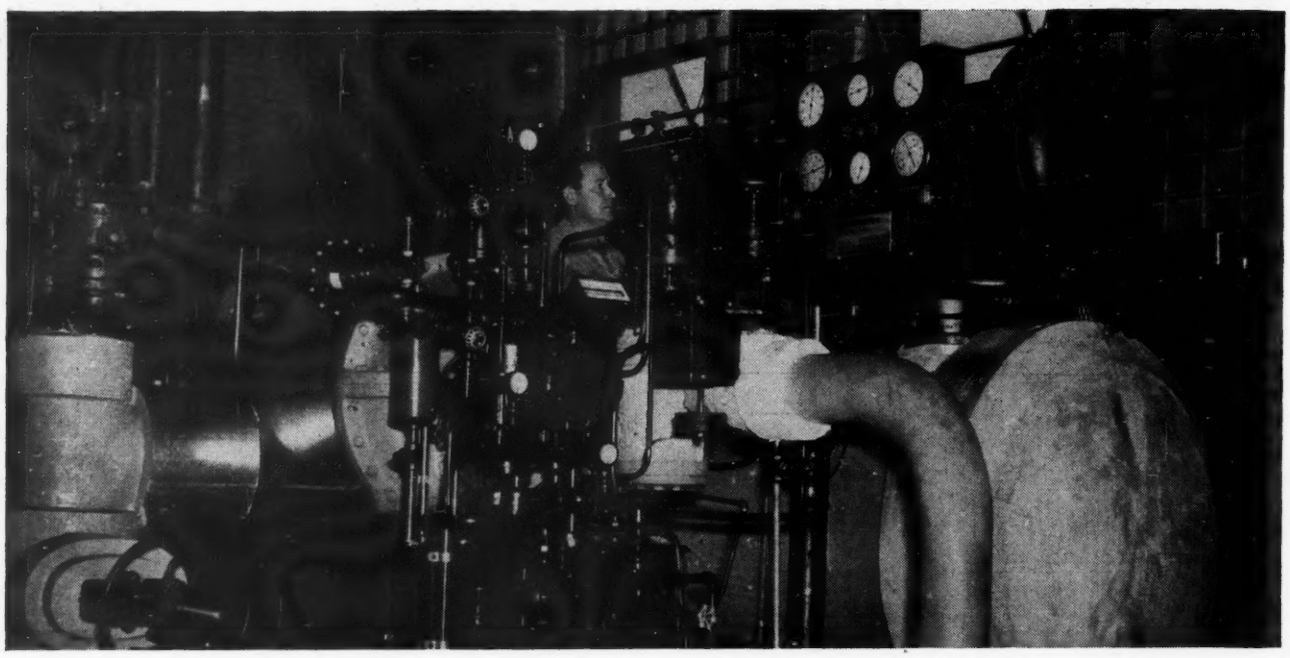
Heat Removal

Beyond the designed relative humidity stabilization, it is obvious that while spraying water into the air system evaporative cooling takes place, converting latent capacity to sensible accomplishment in the absorber unit.

The sensible heat removal equipment automatically synchronizes with the latent heat removal equipment (see diagram), accurately, taking only a minimum of compressor driving steam, which in turn is completely condensed through the concentration of triethylene glycol to effect the desired steam balance. It should be noted that any decrease in the actual latent load over the designed latent load increases the capacity of the units for assumption of part of the sensible load. This reflects in a decrease in the load on the compressor units and results in a further factual dollars and cents operating cost savings through a decrease in pounds of steam required to operate the turbines.

It appears that Necco will experience at least a 40 percent operational

This Compressor Cools the Circulating Water



STEAM turbine driven centrifugal compressor, 250 ton capacity, is used in the system to chill the water which circulates through the ceiling mounted units. The turbine is non-condensing. Intake steam pressure is 200 psi., back pressure 8 to 10 psi.

cost saving with the Cummings System, as compared with operational costs of a conventional-type system.

Results Obtained

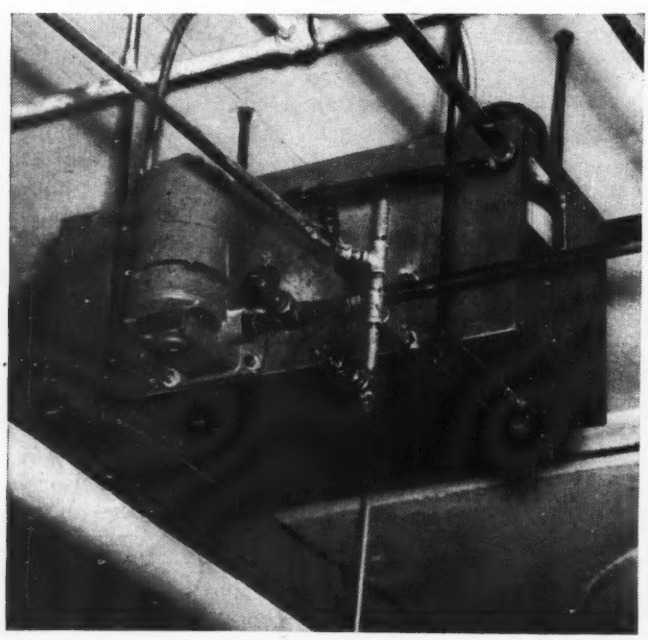
This figure is based on the fact compressors are all driven by steam turbines of the non-condensing type on 240 to 250 pounds per square inch steam and back pressure maintained on the exhaust at 9 pounds pressure. The steam is reused at 9 pound pressure for reconcentration of the liquid sorbent.

Operation results have exceeded expectations. In practically all cases, ceiling cooling units were mounted along those walls enclosing an area where heat flow and loads were greatest. This resulted in such evenness of distribution and control as to maintain less than 1 degree Fahrenheit temperature difference at any one point throughout the area. The control required to separate the latent and sensible heat loads and balance steam usage results in a precision control of the areas. The precision control is a by-product of design rather than a luxury, and is therefore considered an extra advantage at no additional cost.

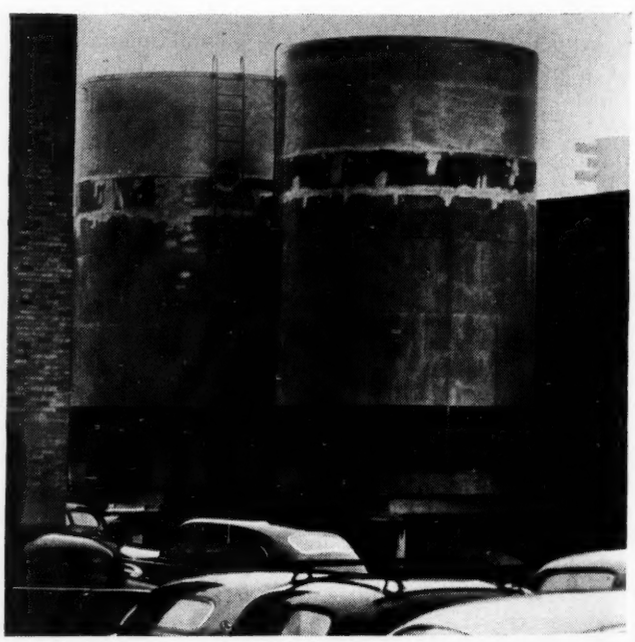
Change Costs Minimized

Since the original designs and layouts of areas were completed on paper, orders placed for equipment and installation begun, several changes in plans have been made. These were caused primarily because of increases in production requirements beyond original plans. Changes of this nature, had a con-

(*Continued on page 205*)



HUMIDIFIERS effect complete vaporization of water. Concealed eliminator plates in the unit prevent water carry-over to area served.



COOLING towers supply condenser water for the centrifugal refrigeration compressors in the power plant.

HELP WANTED!

Unless adequate plans are made in advance, food processors may encounter new difficulties—and added expense —in getting workers for the coming peaks in production

COSTLY competition for migrant and part-time local labor may face many food processors during the coming August-September peak. This is the serious possibility as signs mount that the country's available supply of workers will be considerably lower this summer than in previous seasons.

Shortage of local part-timers, coupled with increases in costs of obtaining foreign help, could decidely hobble the harvesting job.

Fortunately, something is being done about the situation by the U. S. Employment Service of the Department of Labor, which is taking over the farm labor program from the Department of Agriculture. USES, under the direction of Robert C. Goodwin, has launched a program, which again involves the services the 48 affiliated state employment services, along with 1,800 full-time, and 2,700 part-time local public employment offices.

In so far as it affects the food processor, the program closely follows the pattern set up by the Department of Agriculture in recent years. There is, however, one particularly important difference. This year USES places all responsibility for hiring foreign workers upon the employer. Last year, and during the war years, the government made the contracts, paid the transportation, put up a bond for each worker to guarantee his return transportation. With the employer assuming these obligations, the cost of foreign labor will be, of course, increased.

It's a Big Job

Some idea of the size of the job facing USES and the processor can be gained from the overall 1947 statistics. In January, 1947, the canning and preserving industry employed 70,000 production workers. In September the number was 380,000. Of this peak force of 380,000, less than 4 percent are employed throughout the year and not more than 6 percent for as long as six months. Some states show even more extreme variations. The State of Washington, for example, reported employment of 130 in food plants, in February, 1947. In September the number had risen to 25,000. Texas shows an increase from 8,000 to 45,000 within five months; Wisconsin, 1,700 to 22,000 between May and July.

With the employment offices that were used in previous years doing the detail work, the 1948 program can be expected to follow closely the methods that have been proved effective. Pre-season estimates of labor needs have already been made in many areas. Likewise the sources from which local workers might be drawn, and the methods through which they might best be obtained, have been determined. Where it appears that the local labor supply will not be adequate, outside sources are being surveyed.

All the tested devices for reaching potential local workers will be exploited. These methods include radio appeals, utilization of neighborhood movie theaters, handbills, house-to-house canvasses, personal letters, frequent newspaper advertisements, and news material for local newspapers. In previous years these activities were adjusted to the requirements of the area.

Status in the States

In Wisconsin, for instance, approximately 2,500 out-of-area workers were used in canning factories. Orders were received from local employers and placed in inter-regional recruitment, and the States from which the workers were obtained (chiefly Texas, Missouri and Arkansas) cooperated by prescreening applicants and assisting in arranging itineraries for employer representatives. The Wisconsin Employment Service also visited local schools and colleges and made appeals to the students in an effort to draw out the local supply of workers to the fullest possible extent.

The Mississippi Employment Service worked hand-in-hand with the Gulf Coast Shrimpers & Oystermen's Assn. and with the Seafood Workers Union in the task of getting workers where they were needed, when they were needed, and in the necessary numbers.

Sign Up-
to save Crops
URGENT! IMPORTANT!
Help Needed to Process Foods!
AMERICA NEEDS MORE FOOD. OUR HUNGRY FRIENDS ABROAD DESPERATELY NEED MORE FOOD. YOUR HELP IS NEEDED TO SAVE GREAT FOOD CROPS FROM SPOILING. CROPS ARE RIPENING. LABOR IS SCARCE. TIME IS SHORT. ENROLL NOW TO HELP WHEN YOU CAN. DON'T LET THIS NEEDED FOOD GO TO WASTE. WORK IN A FOOD PROCESSING PLANT—FULL TIME, PART TIME, ANY TIME YOU CAN. PREVAILING WAGES PAID. MAKE EXTRA MONEY.
Enroll AT ONCE
MEN, WOMEN
Older Boys and Girls
SEE YOUR NEAREST STATE EMPLOYMENT SERVICE OFFICE

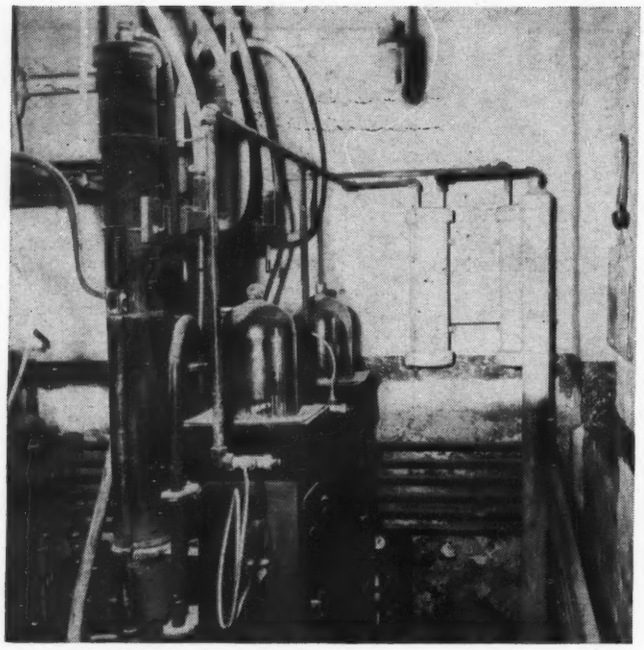
ADVERTISEMENT suggested by USES for newspaper and billboard display. Ads like these have been effective in the past.

Maryland Employment Service personnel obtained lists of former workers from local canners and sent a letter to each such worker requesting information regarding his availability for the approaching season. In cases in which replies were not received, personal follow-up visits were made, with the result that many former workers accepted seasonal food processing jobs.

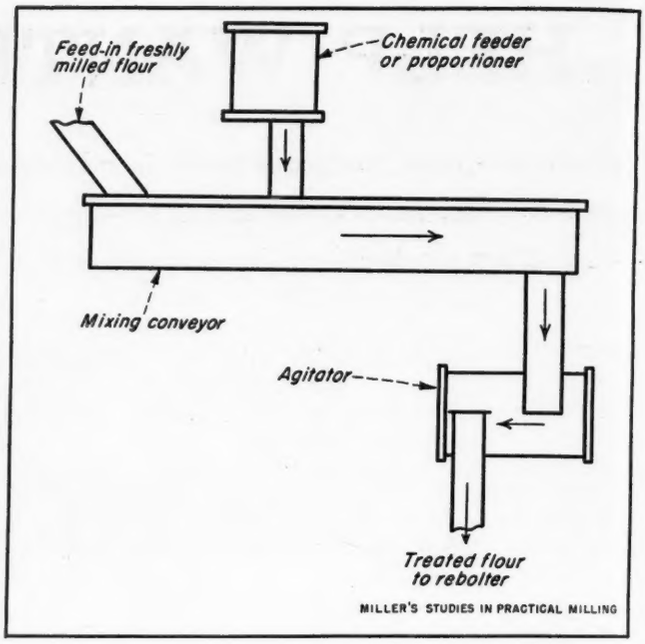
In Delaware where out-of-area workers comprised a very substantial proportion of the peak seasonal food processing work force, approximately a third of these workers were obtained from Virginia and North Carolina through the machinery of the employment service.

More than 6,000 workers were recruited by the Illinois State Employment Service from 11 States in order to meet local needs, and plans have already been crystallized to secure outside workers for the 1948 demand.

The Ohio State Employment Service, in cooperation with the State Canners' Assn., took the initiative in the planned recruitment of workers for seasonal food processing activities, and with excellent results. Appeals were made to civic associations, and public gatherings were arranged. Ministerial associations were also approached, and Veterans Employment Service representatives assisted in the recruitment of workers from the ranks of veterans' organizations and among Servicemen's Readjustment Allowance claimants.



AGENE process bleaches flour by bringing nitrogen trichloride into intimate contact with freshly milled flour in an agitator.



SECONDARY treatment with benzoyl peroxide is usual for obtaining best results with Agene-treated flour.

Flour Bleaches Appraised

Effect of "Agene"-treated flour on test animals has stimulated study of bleaching and maturing agents. New method expected soon

By D. B. Pratt, Jr.
B. A. Eckhart Milling Company
Chicago, Ill.

RECENT news service releases to the general press have brought to the American public the story that white flour, as now treated in the milling of wheat, may cause running fits in dogs under certain conditions. The causative agent was first identified to be nitrogen trichloride (commercially known as Agene) by Dr. Mellenby in his writings in the British medical journal *Lancet* in 1946. Since that time, research studies have been under way in this country as well as abroad to check Mellenby's findings and to evaluate alternate methods of treating flour.

Headway in these studies has been made to the extent that research workers in this country, working independently, have verified Mellenby's findings with dogs fed with Agene-treated flour in percentages greatly exceeding normal dietary rates. Also, it is well to point out that the Agenized flour was treated, for the most part, with far greater quantities of Agene than are used in normal wheat-milling practice. Further, some workers have reported similar results with other laboratory animals using other protein foods treated with Agene. On the other hand, human feeding tests have developed no clinical symptoms.

The effect of these findings is that antagonists of white flour have seized upon the results of Mellenby's work and exerted such pressure against the use of Agene-treated flour that research workers are striving for an alternate treatment for flour that will be more acceptable to nutritionists and at least equal in its benefits to the millers and bakers.

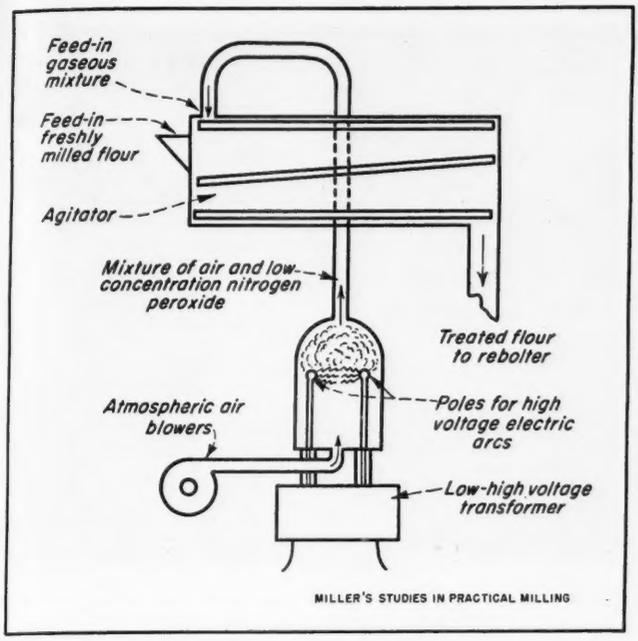
Bleaching and Maturing

In view of the situation as briefly summarized, a review of flour bleaching and maturing is timely. Also, question might be raised on why flour must be treated at all.

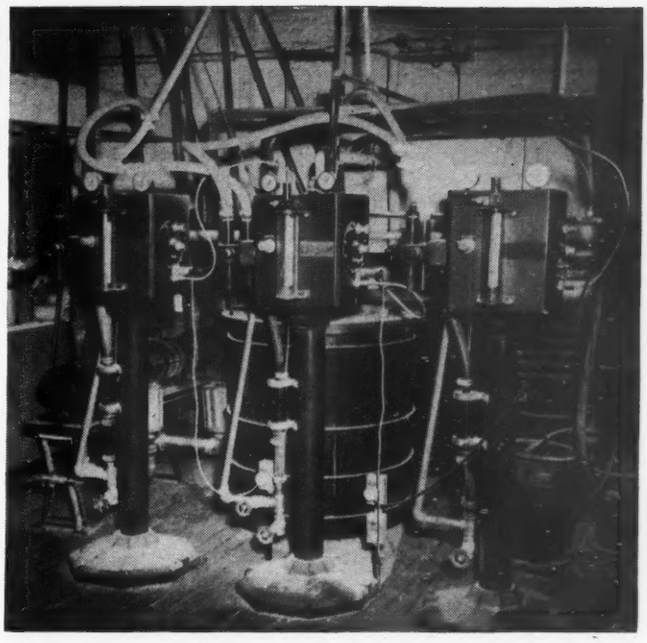
With the introduction of the roller mill and purification systems during the middle of the 19th Century, bakers noticed that freshly milled flour did not behave in baking as did flour that had stood in their warehouses for several weeks. The doughs fermented differently and the color of the bread crumb was whiter in the bread made from the "aged" flour. The change in color of the flour as it aged and the subsequent improvement in baking properties led cereal chemists to investigate means of speeding the change. As early as 1912, investigators explained the bleaching effect of storage as an oxidation of the carotinoid pigments. They also found, however, that simple hastening of oxidation of the carotin does not improve the baking properties, as does natural aging. But natural aging is not economical and needlessly exposes the flour to insect infestation.

Early in the 20th Century, American mills began to bleach flours with nitrogen peroxide. This agent was made first by reacting ferrous sulphate with nitric acid. Shortly thereafter, the "Alsop" process was introduced, in which peroxide was made from atmospheric air by means of an electric arc.

Flour is brought into intimate contact with the bleaching gas by a


Feed-in gaseous mixture
Feed-in freshly milled flour
Agitator
Mixture of air and low-concentration nitrogen peroxide
Treated flour to rebolter
Atmospheric air blowers
Poles for high voltage electric arcs
Low-high voltage transformer
MILLER'S STUDIES IN PRACTICAL MILLING

ALSOP process bleaches with nitrogen peroxide made from atmospheric air by electric arc. It is added to flour in blending unit.



BETA-CHLORA bleach involves addition of nitrosyl chloride and low concentrations of gaseous chlorine to milled flour.

blending or mixing unit known as an "agitator", where the surfaces of the freshly milled flour particles are exposed to the nitrogen peroxide as they move through a conveyor to the discharge outlet. Although this treatment bleaches the flour, it does not appreciably change its baking characteristics.

Agene Treatment

About 1920, the nitrogen-trichloride (Agene) treatment was introduced to the millers. This treatment involves the metering of the nitrogen trichloride gas into the "agitator" where it comes into intimate contact with the freshly milled flour. The gas is produced by passing chlorine gas through a saturated aqueous solution of ammonium chloride. Bleaching by this method results in considerably more than the removal of color. The treated flour performs in the bakery as satisfactorily as naturally aged flour.

Many explanations have been proposed for this maturing action. Some investigators believe there is a modification of the proteins. Others attribute the aging effect to some action in the germ or lipoid constituents. Probably, it is a combination of both factors. Agene-treated flour makes bread of greater loaf volume, finer texture and better handling properties in the dough stage than does the same flour untreated.

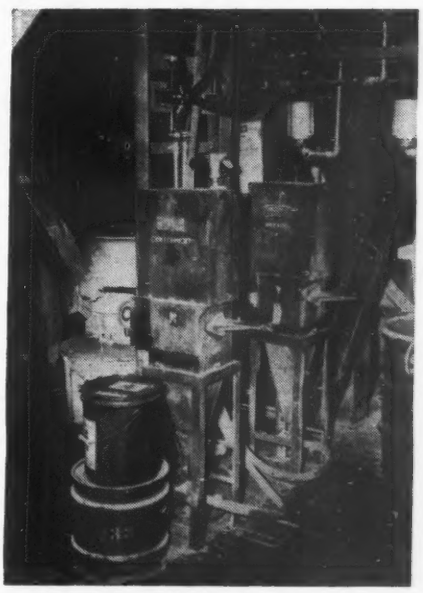
Baking Tests

Baking tests with Agene-treated flour show that it is not completely freed of its carotinoid pigments when properly treated with nitrogen trichloride to have best baking properties. This discovery has resulted in the use of a second and accompanying treatment, with organic peroxides, to obtain a fully bleached flour with desired baking properties. The organic peroxides are of the group normally used in bleaching animal and vegetable oils. One, benzoyl peroxide, has since been universally accepted and used for a number of years. The peroxide is diluted by mixing with an inert salt, such as calcium phosphate. In powder form, it is added to the flour in a mixing conveyor by means of chemical or proportioning feeders.

Other Agents

Another bleaching agent for flour is gaseous chlorine. Metered into the "agitator" it is highly effective in color removal and has some mellowing effect on the protein constituents of the flour. Excessive treatment with chlorine, however, results in a complete breakdown of the flour gluten. Consequently, its use is not widely practiced, particularly in bread flours. Addition of chlorine to soften wheat cake flours has been proved effective with regard to improving cake quality.

Nitrosyl chloride is quite highly regarded as a flour-bleaching agent, but it is never used alone. It is added to gaseous chlorine in low concentrations, usually as low as 5 percent. This mixture is the familiar "Beta-Chlora" bleach. Chlorine or Beta-Chlora increases the hydrogen-ion concentration of the flour, probably

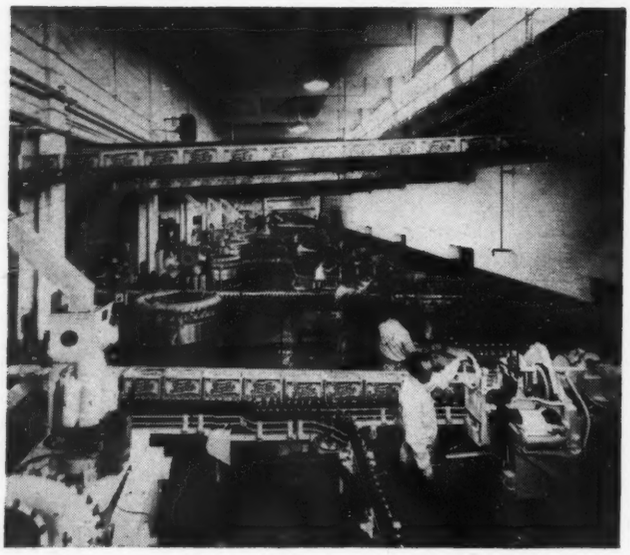


CHEMICAL FEEDERS are used for addition of dry agents like benzoyl peroxide.

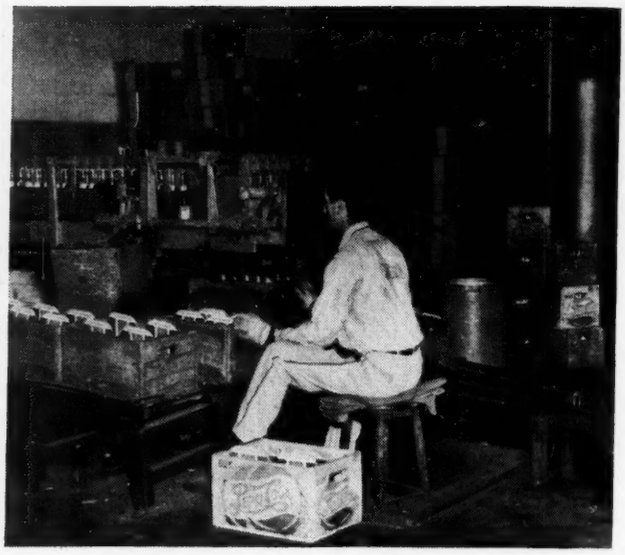
by the formation of hydrochloric acid.

Numerous other oxidizing agents have been used at some time in bleaching treatment. Potassium bromate is the only one worthy of mention. Even it has no effect when the flour, to which it is added, is stored as flour. However, when the flour is made into dough, the effect upon the flour gluten is quite similar to that of Agene. The bromate is added to the flour as a powder in very small amounts, (0.001 to 0.005 percent), by means of chemical feeders. The rate of treatment is determined to some extent by the protein content of the flour. Types of flour that may be

(*Continued on page* 211)



OVERHEAD CONVEYOR carries empties to soaker. Cases return on lower conveyor to join filled bottles at case packer.



CASE PACKER puts bottled goods into cases, 24 at a time. Machine also packs 6-bottle home carriers into cases.

How Pepsi-Cola Simplified Case Handling Operations

Number of warehouses, handling and inventory of cases and bottles are reduced by combined use of conveyors, trailers and fork-truck pallets

By WILLIAM GEISLER, H. A. HAM and HANS GOETZ, Pepsi-Cola Co., Long Island City, N. Y.

REDUCTION in unit handling costs and the elimination of many distribution warehouses are two benefits of the reengineering of materials handling at Pepsi-Cola's Long Island City, N. Y., plant.

Engineers of the company had long felt that considerable savings could be realized in handling operations at this plant, which is the largest carbonated beverage plant in the world. These savings finally became mandatory because of increased costs in labor and materials. To offset these higher costs, it was decided after study that the greatest savings could be made using the fork truck-pallet system of handling cases of bottled soft drinks and empties in fewer, more centrally located warehouses.

The new materials handling system uses both conveyor handling and palletizing. Trailers and route trucks are designed to take pallet loads, which are handled at the warehouses by fork lift trucks. At the plant 50 cases are stacked by hand on pallets. From this point, using the streamlined handling system, cases are handled entirely on pallets until delivery to the retail outlet.

At warehouses, trailers are used for live storage. These trailers serve also for live storage purposes while enroute between the bottling plant and warehouses.

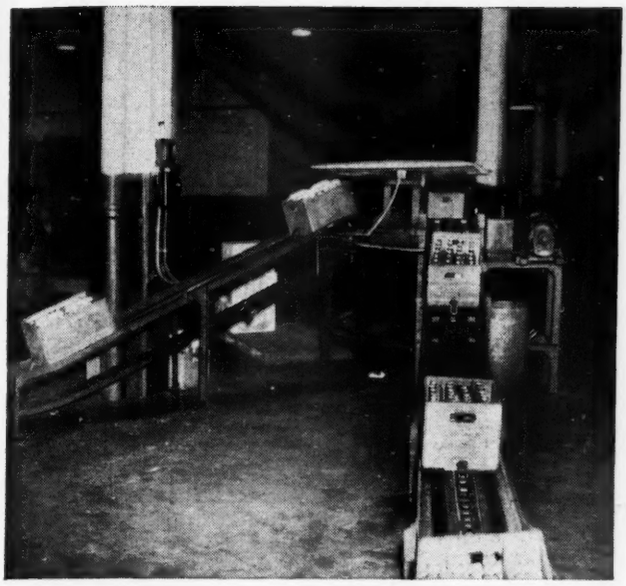
Efficiency is further increased at warehouses by having loading and unloading operations done simultaneously, using the fork truck to transfer a pallet load of full cases from trailer to route truck and then transferring a pallet load of empty cases from the route truck to the trailer.

At the plant, long conveyor lines are used for live storage purposes. Each conveyor line from loading platform to bottle washer holds nearly one hour's supply of cases of empty bottles. The cases of empties from the trailers are fed directly to each production line conveyor. A trailer load takes about 20 minutes to unload and represents slightly over one hour's supply. During the next 40 minutes the trailer is loaded with full goods at the same spot. The cycle is then repeated.

Advantages of New System

Efficiency in warehousing has been increased by the new system. Unit costs have been lowered and speed of shipments from bottling plants to warehouses has been increased nearly three times. Formerly, there were approximately 100 distributing warehouses in the New York metropolitan area. Now four main warehouses do 50 percent of the business. Plans are being made to centralize the balance of distribution.

The new system has helped to a

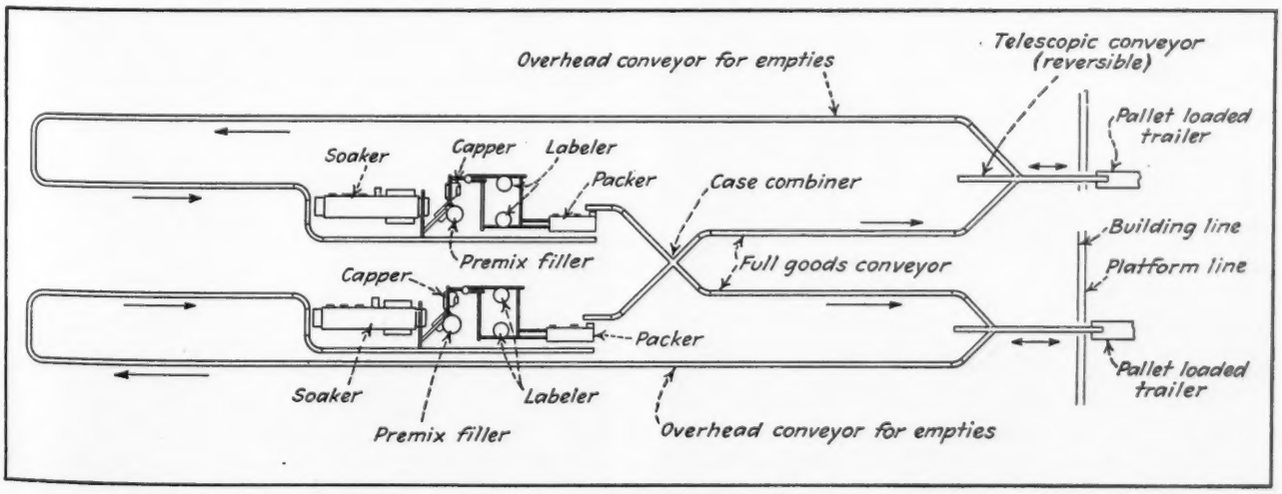


COMBINING BOOSTER, with timed chain-drives, combines production from two lines for delivery to loading docks.

FILLED GOODS on conveyor (left) are loaded on trailers when last case of empties is unloaded to conveyor (right).

LOADING bottled goods on pallets on a flat bed trailer. Cases are delivered to trailer by reversible monorail conveyor.

OVERHEAD CRANE unloads cases of Pepsi-Cola, two pallet loads at a time, from river cargo carrier, "Big Bottle".



FLOW DIAGRAM shows how two bottling lines are arranged for overhead live storage of empties and combining of production from two lines for reloading of trailer. Arrangement permits loading and unloading of cases without respotting trailers.

limited extent also in stablizing employment. During periods of low demand some production is channeled into storage for use during periods of high demand. In this way fluctuations in production and employment are lessened.

Prior to the use of this new system, individual cases were handled manually at the many warehouses, without pallets and fork-lift trucks. This was slow and costly. In addition, warehouse space was devoted chiefly to storage for cases of bottled goods and empties, and the large number of warehouses required many extra thousands of cases. Now, for the same amount of business, with the palletized drop-trailer operation, a smaller inventory of cases and bottles and less fixed capital investment are necessary. Tractor turn-around delays are avoided and round trips are made faster. Furthermore, case and bottle breakage has been decreased by the use of the pallet system.

Old Warehousing vs. New

Formerly, men removed cases of bottled goods from production lines and manually piled 600 cases in trailers, without pallets. One round trip delivery between plant and warehouse took a driver and a helper six hours.

At the warehouses, the cases were unloaded from the trailer, one by one, and piled in the storage area. When ready for shipment, they were removed from the stocks by hand and reloaded on route trucks. Cases of empty bottles were handled in the reverse manner. All these handlings consumed many man-hours, slowed shipments and resulted in high accident frequency rates due to muscle injuries and back strains.

Now that manual work has largely been eliminated, costs have been reduced and handling speeded. Thus the average cost of delivering a case to a warehouse has been cut several cents per case. To get this lowered cost, covered trailers were replaced by flat bed trailers. With these, pallet operations are possible. The pallets are placed on the floor of a trailer at the plant. Then men stack 650 cases of bottled goods on the trailer, 50 cases to a pallet. This system permits one man, the driver, to deliver to warehouses as many as four round trip trailer-loads per day.

Actually, the company operates a shuttle service between the bottling plant and warehouses, with no time lost at either end for a trailer-load of empties or fulls. One tractor and 3 flat-bed trailers are required for the operation. At all times one trailer is used at the plant, one at the warehouse and one is in transit.

Handling is simplified at the warehouses with a fork-lift truck. This truck unloads a pallet of 50 cases from the trailer, one pallet at a time, to a route truck. The route trucks have been designed especially for pallet operations.

Next, the fork truck unloads a pallet of empty cases from the route truck on its return trip to the trailer. The same pallet-load of empties is loaded on the trailer.

This new method provides better sales and distribution controls, since only a few warehouses must now be serviced. In addition, driver-salesman have about one hour extra per day to devote to distributing Pepsi-Cola and Evervess to the retail outlets. This is possible because a route truck can be unloaded, reloaded and checked in 5 minutes, in comparison with the one hour formerly required.

Formerly, distributors rented the warehouse space for storing their stock of empties and fulls. In addition, garage space had to be provided for their route trucks. Now, the distributors need only rent garage space from the company at the central warehouse, thus reducing their operating overhead.

The new method simplifies all checking. This applies to trailer loads or route trucks. Formerly, each case had to be counted and checked. Now shipments can be quickly checked, with less chance of error, since each pallet-load contains 50 cases. Pallet-loads are counted now, instead of individual cases.

Bottling Plant Handling

Handling of cases at the bottling plant has been simplified by hooking together of two production lines. Trailers, positioned at the loading docks at the ends of the lines, can unload empties to live storage on the overhead conveyor. After the trailer is unloaded, production from two lines is returned to the same trailer for loading. This is done by the use of crossover switches on the conveyor lines, leading from the case packers.

Production is at the rate of 500 cases an hour for each of the 10 lines. Each line consists of a bottle soaker, premix filler, capper, two labelers and a case packer — to handle 210 bottles a minute. The case packer easily loads 500 cases per hour, 24 bottles to a case.

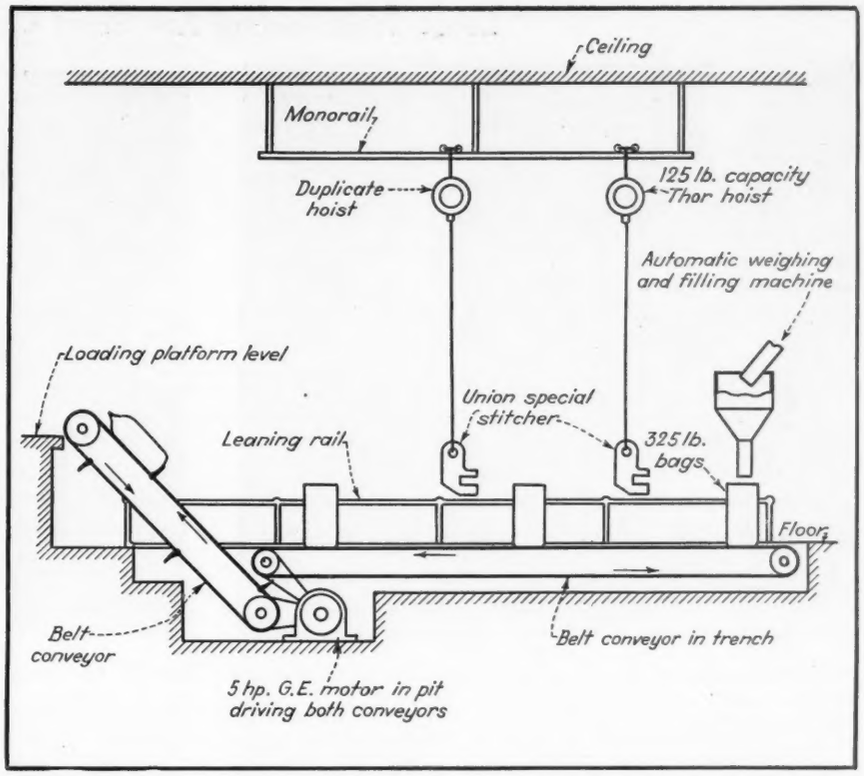
Because of the length of the live storage conveyor for the accumulation of fulls and empties, there is ample time to switch out a trailer load of full goods and replace it with a trailer load of empties, without ever stopping the production line.

UNLOADING a pallets from trailer at warehouse. Fork truck loads route truck and returns to trailer with empties.

LOADING route truck. Fork truck-pallet system at warehouses eliminates storage of empties and bottled goods.

Overhead Bag-Sewing Machines Cut Cost

Installation of a floor-level belt conveyor and overhead sewing machines reduces crew from eleven to six men in bagging area



SPEEDS of conveyor belts are coordinated by means of chain belt transmission from a common shaft of a 5 hp. motor. Conveyors travel at rate of 32 ft. per min.

SAVINGS in excess of $2000 per month have been made in the bagging and shipping operations of the United States Sugar Corp., Clewiston, Fla. This saving results from the installation of sewing machines on an overhead monorail and a continuous floor level belt conveyor. Bagging now keeps pace with sugar production, which is continuous.

The crystals of raw cane sugar fall from the centrifugals located on a mezzanine floor to a grasshopper conveyor on the main or ground floor. This conveyor delivers the sugar to a continuous bucket elevator, which lifts it to the packing hoppers. Since the operation is continuous, these hoppers are not very large. They function primarily as a surge tank in the flow.

Sugar is filled in 325-lb. burlap bags for shipment. Automatic scales drop the correct amount from the hopper into the bag on the main floor.

Old Method

In the former operation, laborers using a hand truck wheeled the open bag of sugar over a test scale, where it was checkweighed, and corrected if necessary. The bags were then stood in line on the floor and hand sewn. Hand trucks were again employed to deliver the sewn bags to an inclined belt conveyor which elevated them to the loading platform. The loading platform is level with the floor elevation of a standard box car. A movable steel plate is used to bridge the gap to the car. An industrial truck was used to load the railroad cars.

This method of operation employed a crew of eleven men and one foreman.

New Operation Described

In the present operation, an endless floor-level belt conveyor has been installed underneath the existing packer. The packer and automatic scales are retained in their original position and elevation. In operation, the filled bag drops from the packer to the belt conveyor, which travels at the rate of 32 ft. per min. A wood railing along the edge of the belt acts as a support to prevent the open bag from tipping.

Parallel to, and directly above the conveyor a monorail with two trolleys has been installed, and attached to each trolley is a 125-lb. capacity Thor hoist carrying a Union Special stitching machine. One stitcher functions as a standby, for use in the event of failure of the other machine, thus eliminating lost time. The hoist permits the operator to raise or lower the stitcher as the bag requires it. Stationed just before the stitcher, a laborer straightens out the bag on the conveyor line, preparing it for the sewing machine operator. The bag is sewn as it continues along the belt.

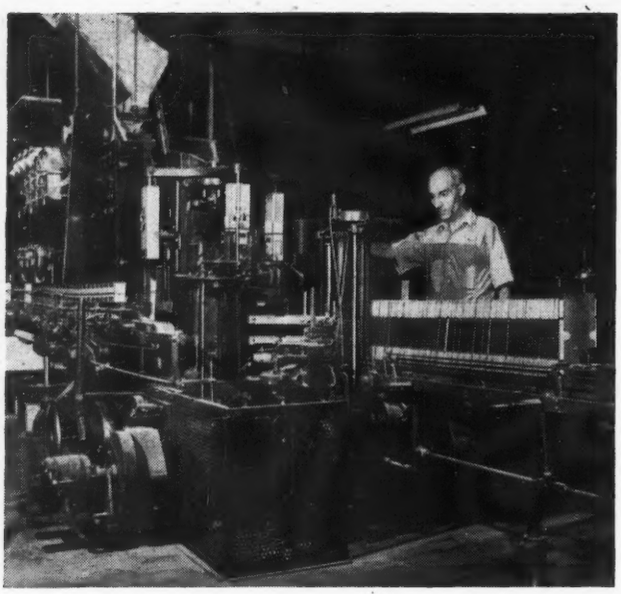
The floor level conveyor and the next conveyor, an elevator, are driven by chain belt power transmission from a common shaft of a 5 hp. motor. The speeds are synchronized. As the bag leaves the floor-level belt, a man stationed at this point turns the bag and places it on the next conveyor (the belt elevator) in the desired position for delivery to the pallet on the loading platform. Bags are stacked four high on the pallet. The pallet is stationary. Its construction permits the forks of a lift truck to pick up the stack of bags direct.

Handling Minimized

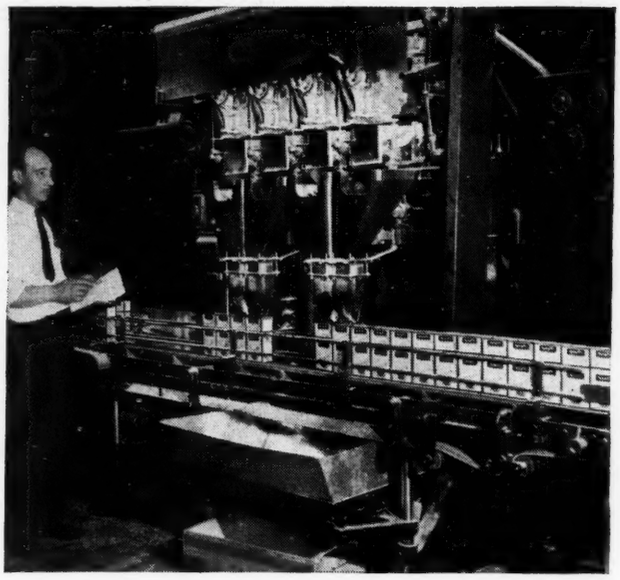
An electric power lift truck is employed to carry and stack the bags in the railroad car. Using this method of loading, a car of sugar (250 sacks) can be loaded in a period of 45 min.

The revised operation employs six men and one foreman as against the original of eleven men and one foreman. Since this is a 24-hr. 7-day-week operation, the savings are considerable. In addition, the physical effort of the individual workman in the crew has been greatly reduced. Transportation of the heavy filled bags is now done completely by power machinery.

Least Troublesome Are Short Goods...



FORMING cartons on the Pneumatic Scale Corp. packaging line for short goods at V. La Rosa & Sons' Brooklyn, N. Y., plant.



FILLING free flowing macaroni products into the formed cartons with four-scale net weighers equipped with vibrator feeders.

Problems in Packaging Macaroni

- ▶ **Short Goods—Free-Flowing, They're Easiest to Handle**
- ▶ **Fluffy Goods—Once Difficult, They're Now Yielding to New Devices**
- ▶ **But Long Goods—Continue to Pose Numerous Puzzles in Weighing and Filling**

By JOHN V. ZIEMBA,
Assistant Editor, "Food Industries"

DEMAND for macaroni is bigger than ever. What's more, ability to produce it in quantity is now unquestioned, particularly with the recent development of continuous macaroni presses (March Food Industries).

But — and this a big but — the high-speed production is only half the battle.

Before these products can move in fast flow to the consumer, another element is requisite — high-speed packaging. And this has proved to be a high hurdle.

True, problems have been solved in a prime phase of the packaging operation, and there have been notable improvements in other phases. However, several knotty problems still remain to tax the ingenuity of the packaging equipment makers. Primary challenge to speed packaging has been the widely varied shapes and sizes of macaroni products.

First off, a mention of the bright side: Those difficulties formerly encountered in weighing and filling fluffy egg noodles have now been surmounted. While heretofore most plants packaged these noodles by hand, except for carton sealing, today we have high-performance packaging lines—such as at V. La Rosa & Sons, Inc., Brooklyn—which are completely automatic except for feeding the empty cartons to the weigher. At this plant, equipment made by Triangle Package Machinery Co. scales and fills the product into cartons, while machines supplied by Container Equipment Corp. do the carton sealing.

Instead of packaging noodles at the old rate of about 20 packages per minute, new lines are capable of handling some 80 packages a minute.

How such modern installations round out an operation is evident. La Rosa's short goods—free-flowing products like elbows, pastina, and alphabets—are packaged on completely automatic lines, long used for these goods. Each of these Pneumatic Scale Corp. lines is equipped with a carton feeder, bottom sealer, four-scale net-weight weigher and top sealer.

Further, La Rosa's lines for long goods, such as spaghetti, vermicelli and macaroni, are also automatic, except for weighing and filling. Long goods comprise a large proportion of the company's production. These are all packaged on F. B. Redington Co. lines, where wrapping, carton loading and carton sealing take place.

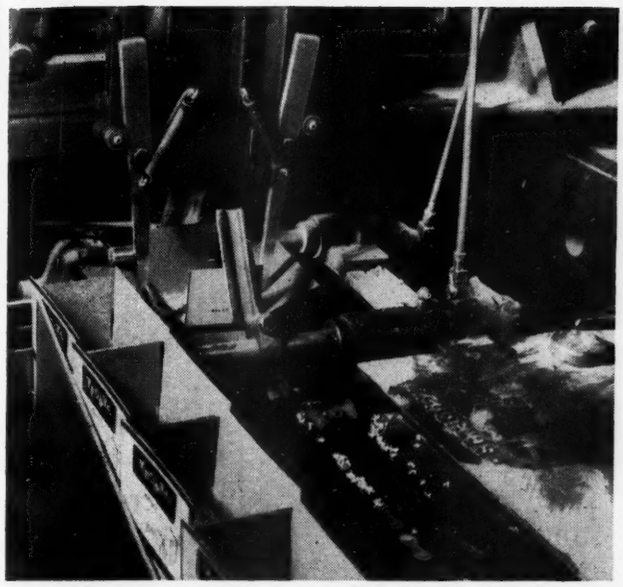
A detailed consideration of the handling aspects in the three classes of goods—fluffy, short and long—will help give the current picture:

Packaging Fluffy Noodles

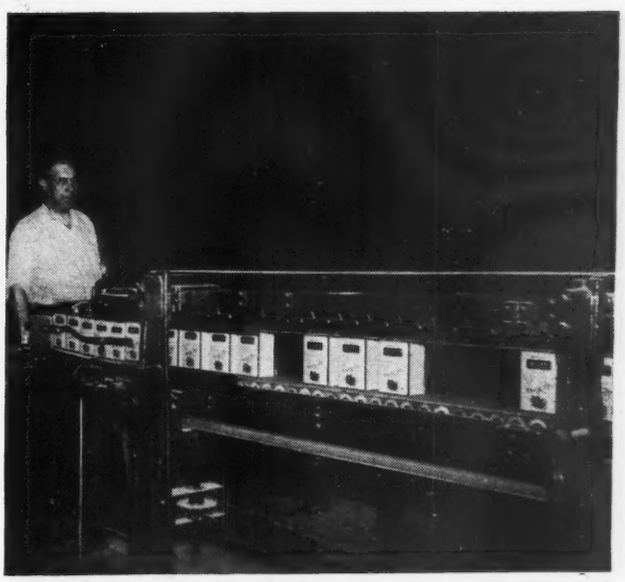
Fluffy egg noodles are the most difficult of all macaroni products to package. They do not lend themselves readily to machine packaging for several reasons.

First, the noodles are irregular in shape, and the strands interlock. Second, they are not free-flowing, and are difficult to feed evenly to the weighers. Finally, the noodles

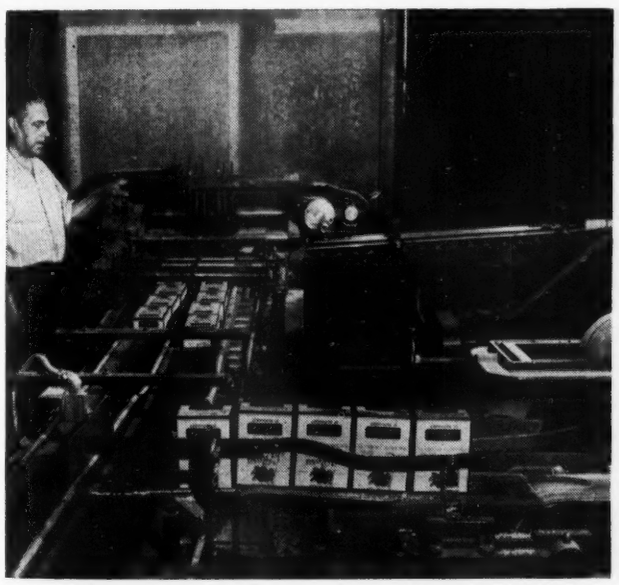
...Which Package Readily on Automatic Lines



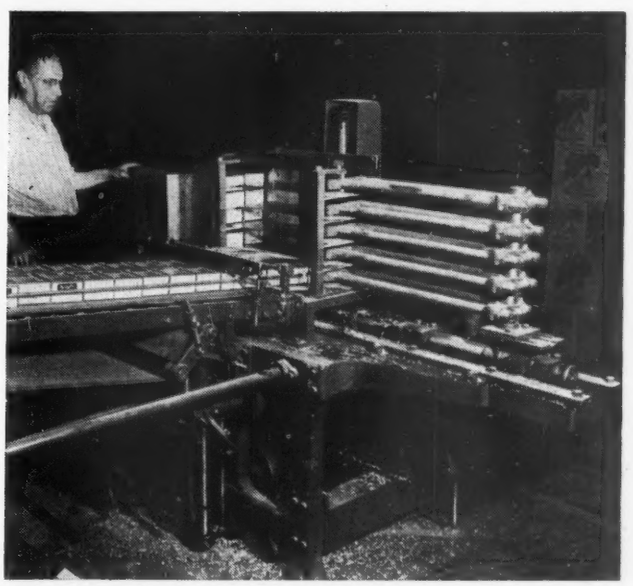
GLUING and folding the top flaps automatically, after the cartons have been filled with the free flowing type of macaroni products.



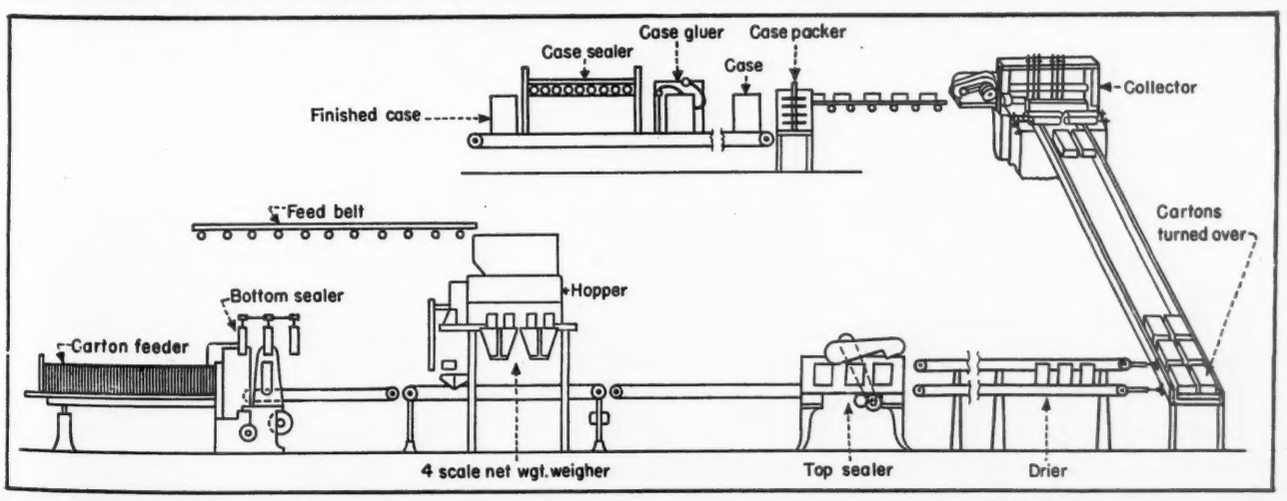
TOP SEALING the cartons. Travel is moderated between two compression belts to allow enough time for glue to dry thoroughly.



COLLECTING cartons from two lines on Standard-Knapp line. Collector discharges cartons into case packer in two balanced lines.



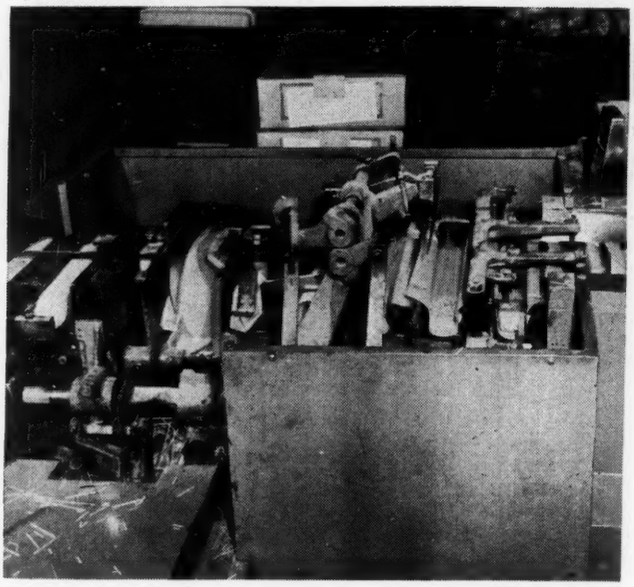
LOADING cartons automatically into cases with the case packer. The packer forms the load of 20 cartons and pushes it into case.



FLOW DIAGRAM shows how short goods are automatically packaged at La Rosa plant. Pneumatic Scale Corp. machines form, fill, close and seal the cartons. Standard-Knapp Corp. machines collect and pack the cartons into cases. Cases also are glued and sealed.

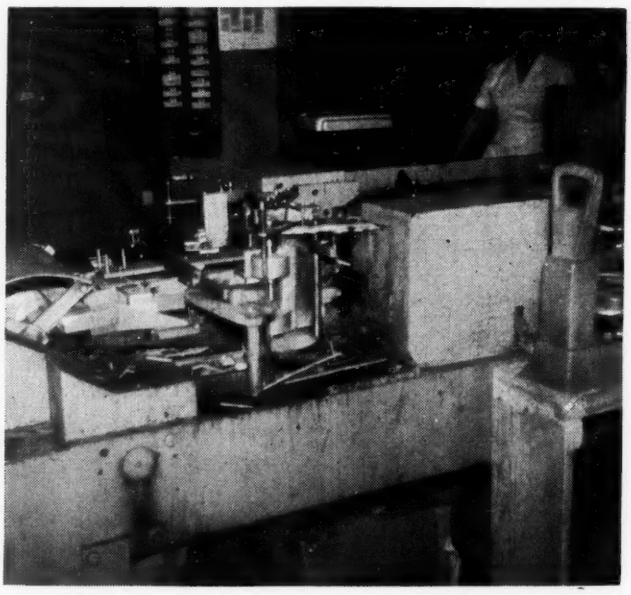
Long Goods Are Slowed in Weighing and Filling Operations

PACKAGING long macaroni products at La Rosa's with Redington machines—automatic, except for weighing and filling operations.



WRAPPING the macaroni in wax paper after the paper has been cut from a roll and then positioned in endless bucket conveyor.

LOADING the cartons. After the cartons are expanded, they are transferred to the conveyor and the macaroni is inserted into them.



GLUING and sealing the cartons. After these operations, cartons travel through a drier conveyor which measures about 9-ft. long.

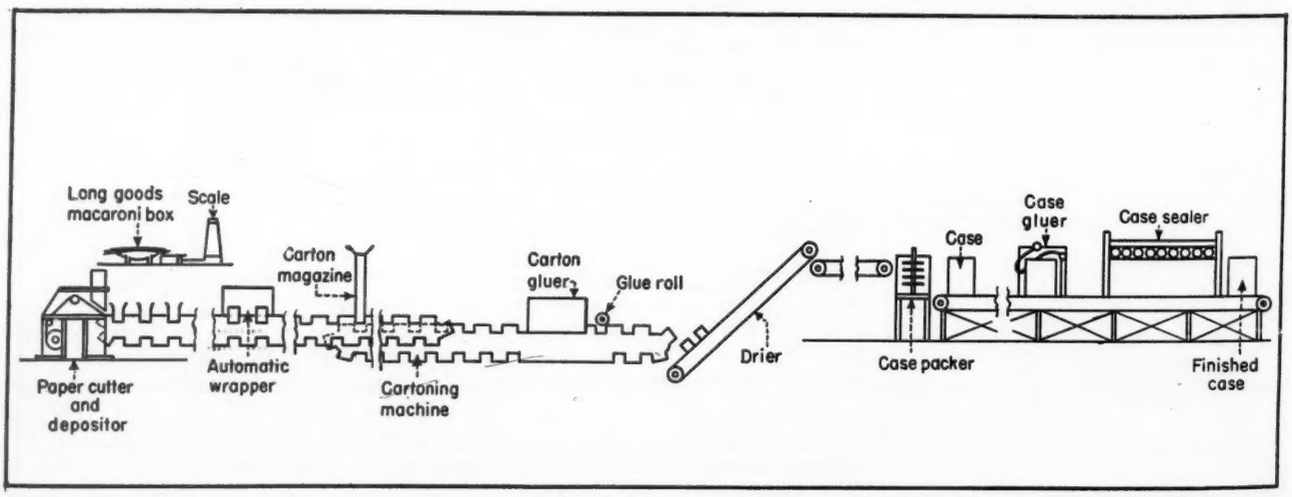
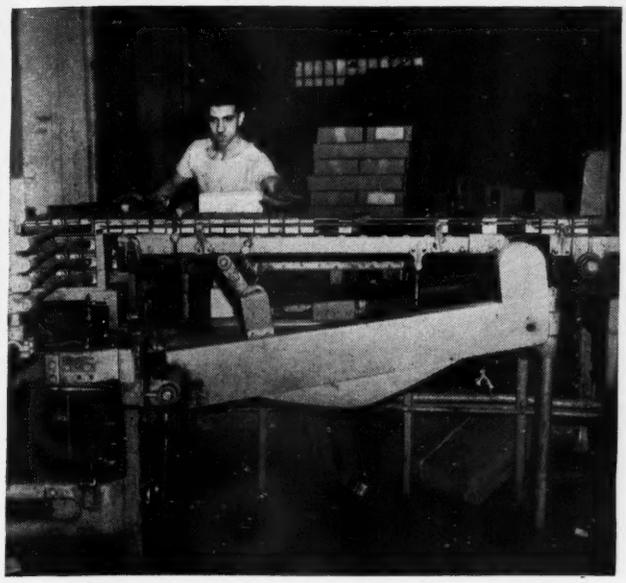


DIAGRAM shows the long goods packaging operation at La Rosa's plant. Redington machines wrap the macaroni, insert it into cartons and then glue and seal the cartons. Standard-Knapp machines load the cartons into cases, then glue and seal them.

These Machines Speed the Casing, Gluing and Sealing



CASE PACKING macaroni. A case is placed over a funnel and the packer automatically pushes the load of cartons into the case.

GLUING and sealing of cases on Standard-Knapp equipment. In the final step, the cases enter the compression unit where glue sets.

break up in the weighers, making it impossible to control weights and avoid slack fills.

The hand weighing and filling of these egg noodles is done at the rate of 15 to 20 cartons per minute. If the speed of the operation is increased by machine to about 30 per minute, mechanical difficulties occur. For example, in closing the shutter on the weighing bucket, half of the strands of noodles may remain in the bucket. When this takes place, two things can happen: Either the noodles are pulled back into the hopper and the carton is short weight, or the noodles break when forced through the hopper and the carton is slack filled.

These difficulties, however, have been overcome by the use of Triangle machines. Controlled amounts of free-flowing noodles are fed from a waist-high hopper to the weighing station by two automatic conveyors. At the weighing station, the noodles travel over a vibrating tray, and the correct weight of noodles is filled into a carton by an air-operated plunger. Cartons are then glued and sealed with Container Equipment Corp. carton sealers.

Packaging Short Goods

Packaging short goods has not been a problem because the products are free flowing.

To package the short goods, carton feeding, bottom carton sealing, weighing, top carton sealing and carton compressing and drying units are used on the Pneumatic Scale line. The entire line is automatic and operates at the rate of 30 cartons a minute.

The first unit on the packaging line is a combination carton feeder and bottom sealer. Together, these operate to form a bottom sealed carton.

First, the knocked-down cartons are stacked by hand in the feeder magazine, and from this point on the operation become automatic. The cartons are then opened, one at a time, and fed into a pocket from which they are pushed upward onto wooden mandrels. The mandrels hold the cartons square while the bottom flaps are folded, glued and sealed under 2000 lb. of pressure. As each mandrel rotates to the last station, a carton is stripped off and carried away on a conveyor to the weighing machines.

Botton sealed cartons are filled with macaroni by four-scale net weighers, equipped with vibrator feeders for handling loose macaroni. Since macaroni is bulky and fragile, the flow is promoted mechanically. Vibrator feeding trays, on the weighing machines, feed the macaroni to the weighers in an even flow.

These vibrators are activated to regulate the production flow, and they are controlled by a rheostat to speed up or slow down the operation. As the macaroni moves forward on the vibrator trays, it drops off the end of the trays into the circular weighing buckets. When the correct weight is reached, the scales trip and stop the action of the trays and the feed of macaroni. The shutter of each weighing bucket opens automatically and the fill drops into the carton below.

After the weighing operation, the cartons travel along on a conveyor to a top carton sealer. Here the top flaps of the cartons are folded and glued. The top seal is secured by passing the cartons between moving compression belts at a comparatively slow speed to provide sufficient time for drying. Then when the cartons emerge from the drying conveyor, they are ready for packing and shipment.

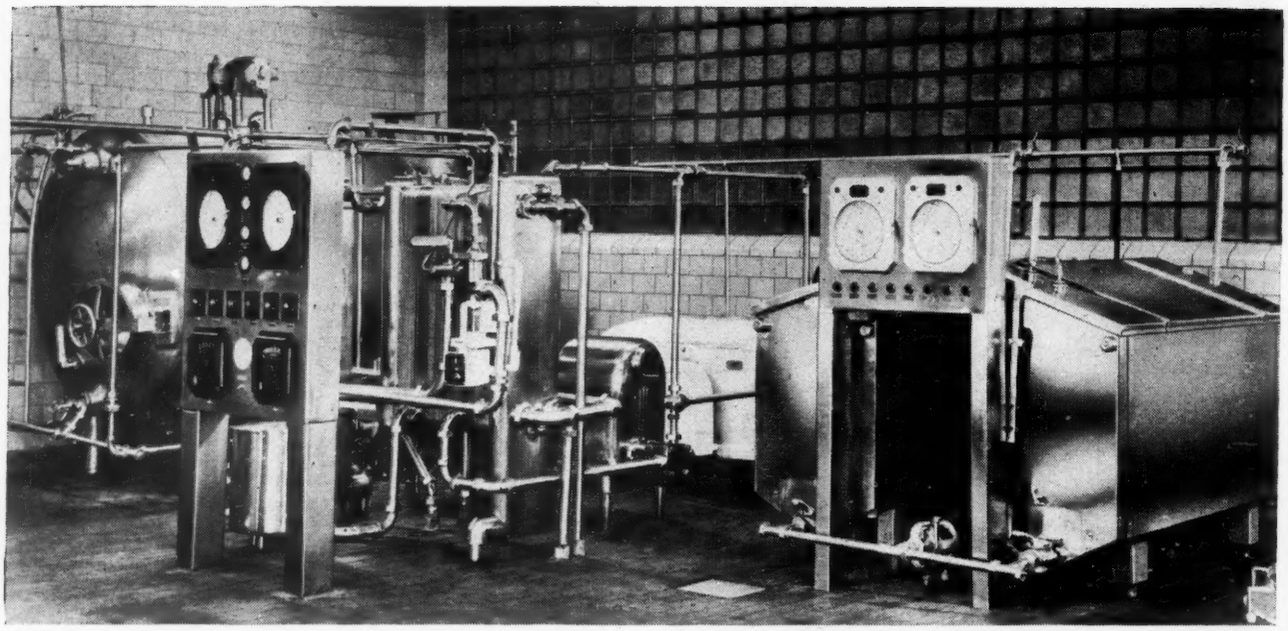
Packaging Long Goods

Before the first Redington machine was installed, long cut macaroni goods were practically all hand packaged by a team of three girls. One girl weighed the macaroni. A second girl wrapped it. And a third girl inserted it into a carton and glued the carton flaps.

This method varied somewhat in different plants. Later, packaging became partly mechanized. One girl weighed, wrapped and inserted the macaroni in a carton. The carton was then placed on the intake of a gluing machine where the flaps were turned in and sealed.

With the Redington packaging lines, all but the weighing operation is automatic. The machines operate at speeds up to 80 packages a minute. Eight to ten girls are required to operate one line. The number of girls needed is determined by the product being packaged and the efficiency of the operators. One girl supervises the operation and keeps the carton magazine filled.

(*Continued on page 206*)



MILK is pasteurized at the rate of 8,000 lb. per hour in the continuous short-time Cherry-Burrell pasteurizer (center) at Sanitary Farm Dairies, Cedar Rapids. The pasteurizer is automatically controlled and is essentially 100 percent stainless steel construction. Even water lines and the electric conduit are encased in stainless steel. Two 200-gal. spray pasteurizers at right are used for standardizing cream and processing chocolate milk and high-fat special milks.

Processes That Point the Way

Lower costs by continuous processing permit lower prices, higher profits, or merchandising advantage. Processes and problems are discussed *

FOOD costs take too big a slice out of the average family's income. At recent prices, the figure is nearly 30 percent, and it has been 35 percent for many consumers. Historically, people have spent 25 percent of their income for food and 75 percent for other things.

Because disproportionately high food costs eventually can wreck the economy of the country, these costs should be reduced all along the line —from farm to retail store. One way for the processor to get his costs down is to go to continuous processing. By so doing, he would also guarantee the security of his business against the inroads of competition.

"Continuous" Defined

Continuous processing is a method of manufacturing in which each unit operation and each unit process takes place separately, but in uninterrupted sequence, with the materials in continuous flow under automatic control. Some continuous processes, such as flour milling, are as old as the hills. But these are relatively few in number. Other examples of continuous processing are the short-time high-temperature pasteurizing of fluid milk, refining of vegetable oils, and the manufacture of jelly, macaroni, mayonnaise, and Minute Tapioca.

In between the 100 percent continuous process and the batch methods, is what may be called continuous-batch operation. This method now is utilized in making catchup and ice cream and in the holding method of pasteurizing milk.

Batch-operation is exemplified by canning, brewing and bread making (except for the continuous baking operation).

In a general way, continuous processes have evolved from batch methods through the intermediate step of continuous-batch operation where different batch-prepared ingredients feed into a continuous process line.

Production Advantages

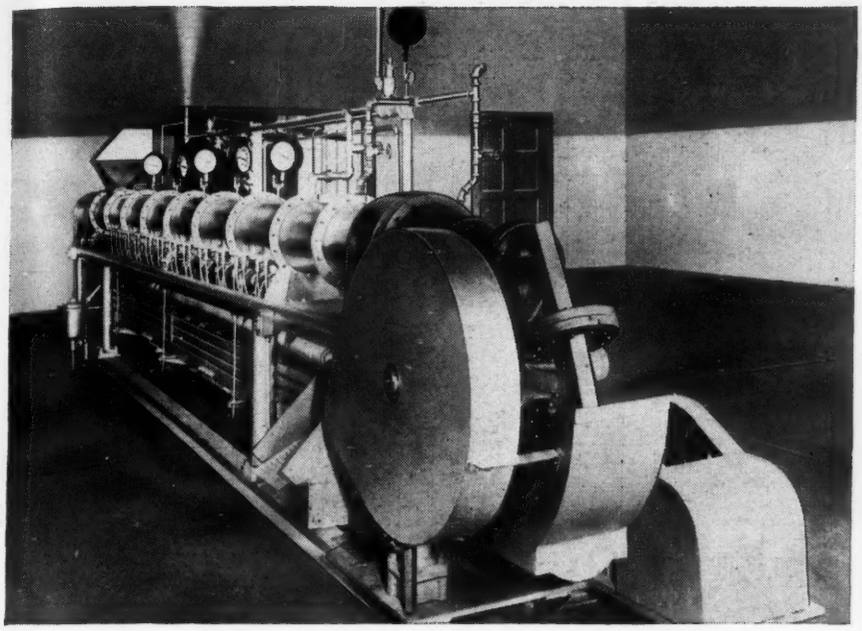
If it yields a quality product, a continuous process has many highly important advantages: It requires less labor, saves floor space in the plant, permits concentration of heat (if a heat process) and may even reduce the investment. But perhaps the greatest advantage is better quality control and greater uniformity of finished product.

In considering the advantages of continuous processing—or any other cost-cutting method—the opportunity to spend part of the savings to increase merchandising efforts and outsell competitors should not be overlooked.

How to Proceed

Before attempting to develop a continuous process, have a thorough analysis made of every single step in the manufacturing methods utilized. This analysis should be done by a food technologist. To determine the right way of doing the job continuously, all variables must be known and ways of controlling these variables automatically must be worked out. A sound approach is to write out every unit operation or process in sequence and proceed

* Based on a talk by Dr. L. V. Burton, before the New York Section of the Institute of Food Technologists, Feb. 18, 1948.



FRUITS or vegetables are cooked, blanched or peeled in a continuous operation with this machine built by Cleaver-Brooks Co. The processing is done under steam pressure in moving retorts formed by gasketed pistons on an endless chain which travels through a stainless steel tube. The unit may be used as a cooker in packing salmon.

from there. If two or three things happen simultaneously, it may be very difficult to convert to a continuous process.

Where Patience Paid

Patience is essential in evolving continuous methods, because many unforeseen difficulties arise. It took 15 years of intermittent effort to work out the spectacularly efficient Minute Tapioca continuous process. In the beginning, steam-jacketed batch kettles with stirrers were used for gelatinizing the Orient-imported cassava utilized in making the tapioca product.

It was a slow, laborious method, particularly because workers had to dig the tapioca out of the kettles. Some one had the idea that the operation could be made continuous by passing the product through a steam-jacketed screw conveyor. The machine was built, but when it was put into operation the heavy, gummy material overloaded the motor driving the screw and blew the fuses. A much bigger motor solved this problem, but it twisted the screw conveyor shaft. A larger shaft overcame that difficulty, but the smaller space between the shaft and jacket reduced throughput to the point of impracticability. In the end, the proper equipment turned out to be a series of gyratory mixers which discharge onto a conveyor that carries the product to the driers.

Yes, it took a lot of patience and several years of intermittent effort to develop this process, but the company achieved a tremendous advantage over competitors—it took over practically the entire market.

Mayonnaise manufacture is another interesting continuous operation. About 100 gal. of high-quality mayonnaise flows out of each discharge pipe every minute. There are 14 variables under continuous automatic control. Three minor variables cannot be controlled, yet this does not detract from the product. This illustrates the fact that it is not always necessary to have everything under complete automatic control in a continuous process. The most important variables, however, must be completely regulated.

Better, Cheaper Product

Remarkable product uniformity and low operating cost are achieved by the continuous cranberry jelly process invented by G. T. Reich. In existence about 10 years, the machine now is in the plant of Minot Food Co., Bridgeton, New Jersey. In this 1,400 gal.-per hour continuous operation, one man, who watches a refractometer, replaces 9 cooks—an impressive saving in labor. Another advantage is that no pectin need be added to the product, as none of the natural pectin is destroyed by the very rapid continuous process which is employed.

In jelly making, the principal thing is to hold flavor and have uniform density. The Reich process controls the jelly to 1 deg. Brix, and remarkable product uniformity is attained.

Proportioning devices are essential to many continuous processes. Dr. Reich had to develop one which not only would proportion the flow of two ingredients but would halt the flow of either one if flow of the other stopped.

Reasons for Uniformity

Why is it that a continuous process of the Reich type gives a more uniform product than the batch operation? There are several reasons. Suppose that the batch operation uses eight kettles, but no two are similar. No. 1 and No. 2 may have a different thickness of metal. No. 3 has a different design. The outlet boss in No. 4 and the inlet boss in No. 5 are not the same as in the other kettles. No. 6 has valve leaks. The traps in No. 7 do not work. All of these differences prevent product uniformity. They may cause uncontrolled hydrolysis while evaporating and discharging the product.

New Processes

Latest continuous food process to be revealed is in macaroni manufacture (FOOD INDUSTRIES, March, p. 74). This lowers costs from 2¢ to 1¢ per pound, gives absolute uniformity of short cut goods, and results in higher quality. One man can operate the process compared to four for the old method. Production is now 3,000 lb. per manhour, against 350 lb. by the batch method.

Much interest has been aroused recently in a machine for the continuous processing of dough mixtures. This is in the experimental stage, and it involves the problems of proportioning flour and water, also the question of fermentation. Until these steps can be separated and put under automatic control, it will be difficult for the bakers to produce a salable bread with the process.

Considerable labor might be saved by this process. The machine has a capacity of 5,000 to 6,000 lb. of dough per hour, and one man can operate two machines. With the present batch method, production is about 2,000 lb. per manhour.

The Human Factor

Technical problems are not the only difficulties encountered in introducing a continuous process. There is a human factor, too. Employees like to stick to the traditional, and they usually fear that the more efficient process will do them out of a job. The way to put their minds at ease is to promise the workers that the process will not result in their being fired, and to convince them that it will make their work easier.

1. FAT trimmed from hams is one source of hog fat for lard making. About 15 percent of live weight of hog is lard.

2. RENDERING of trimmings is first step in process. Steam kettle is shown being charged for rendering operations.

Lard Takes on New Properties

Improvements in taste, odor, appearance and stability at room temperature are achieved without decrease in shortening or nutritional properties

By FRANK C. VIBRANS

American Meat Institute Foundation, Chicago, Ill.

THERE is a technological trend in lard manufacture which involves improving the product to return it to its former top rating in the highly competitive field of shortenings. This trend applies regardless of the method by which lard is made. It includes increased stability, reduced flavor and odor, stronger emulsifying property and better packaging.

This trend is of technical and economic importance to both lard makers and users of shortenings. As long as swine are raised and slaughtered for food, lard will be one of the important commercial commodities. About 15 percent of the live weight of a market hog is lard—more than 2,000,000,000 lb. in annual production.

Rendering Methods

When lard production was less in poundage, it was readily consumed. For many generations lard was regarded as the preferred shortening for bread, pie crusts and general frying. The demand at least equalled the supply. It is not surprising that lard makers gave little thought, until relatively recently, to changes in methods of rendering and subsequent processing. Lard-making required a minimum of technology and quality control. The open-kettle method was used both on farms and in the existing pork-packing plants.

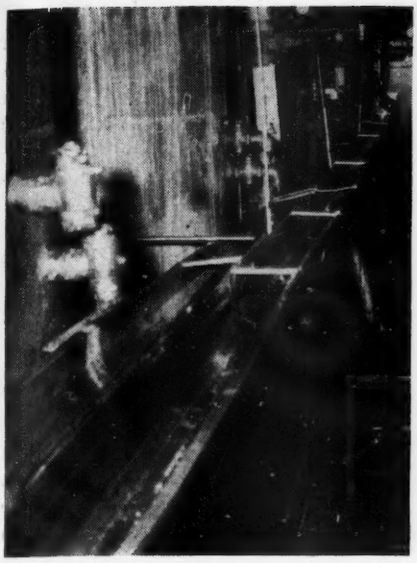
Concentration of pork-packing in commercial plants required a faster way of converting hog-fat into lard. Pressure cooking of the fats with live steam was the result. Now, more than 85 percent of all packing-house lard is steam rendered. Further technological progress has introduced another lard-making method, known as "dry rendering," and its use is increasing slightly. Development of these two methods has not, however, fully replaced open-kettle rendering and farm or country rendering, although the latter two methods are of less importance in tonnage of lard production.

Lards made by the different rendering methods have been sold generally in open competition with each other at a very little difference in price or buyer's preference. This practice is as it should be since all lards from similar fats have the same culinary properties regardless of rendering method. The only difference in the lards is in flavor and odor. However, for a number of years lard has been selling on a price basis regardless of its relative culinary value. Hence, the trend toward lard improvement and study of ways and means of accomplishing that improvement.

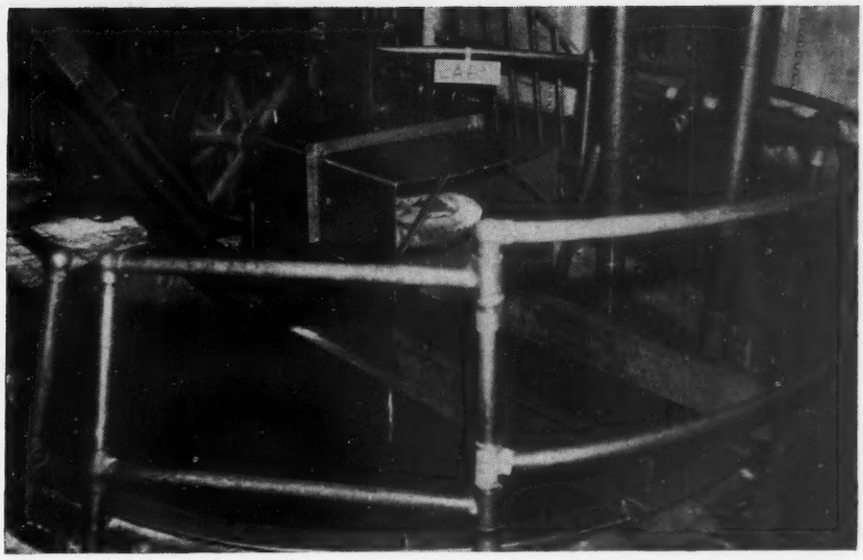
Bland Shortenings

The trend to reduce flavor and odor began with the growing retail demand for a bland shortening; particularly one which need not be kept under refrigeration but can be stored on the pantry shelf without melting or becoming rancid.

There are definite indications that a considerable quantity of lard will be made to meet these requirements. Greater resistance to temperature changes is obtained by hydrogenation or by the addition of "lard flakes" to raise the melting point. Resistance to development of rancidity has resulted from the addition of antioxidants. A bland lard with higher smoking temperature has been obtained by removing free fatty acids and de-odorizing with steam. Stronger emulsifying property has been imparted by the addition of mono- and di-glycerides. New pack-



3. MELTED fat drains from vertical rendering kettles into steel trough.



4. SETTLED lard is bleached in steam-heated tank, fitted with agitator to keep filter aid in suspension. Lard may be bleached with either fuller's earth or caustic soda.

aging methods also are being developed.

The manufacturing procedures that lard must undergo to meet the indicated requirements are well known, and equipment manufacturers have designed plants to process fats into bland products with the other desired characteristics. In many instances, the only change needed in plant design is the adaptation of procedures to the individual plant requirements.

Although many of the proposed improvements for lard are relatively new, some have been in limited use for a number of years. Three bland products made from lard are on the market. One, Cudahy Packing Company's fully hydrogenated lard, "Clix", is a veteran of over 20 years. Another, Swift & Company's "Bland Lard," now sold under the name of "Swift'ning," has been successfully marketed in certain areas since 1940. It is lard containing "lard flakes," di-glycerides, mono-glycerides, resin guaiac and citric acid. The third, Kingan & Company's "Sea-foam" was put on the market in February 1948. In addition to lard, it contains "lard flakes," vegetable oil, N.D.G.A. and citric acid.

Significance of Improvements

To evaluate properly the significance of these improvements in lard, one must realize that, in the main and without regard to the rendering method used, lard has been considered a finished product as soon as it was rendered or, at most, after it was slightly bleached with fuller's earth to whiten and clarify—to give basis for the term, "refined lard." Differences in odor and flavor are the result of different rendering methods. Open-kettle and dry-rendered lards are finished in contact with dry cracklings and have the odor and flavor of roast pork. Steam-rendered lard, on the other hand, is rendered in the presence of an appreciable quantity of water and acquires the flavor and odor of boiled pork. When a preference has been shown for one type of lard, it has been based on the difference in odor and flavor, and not on the shortening power or other culinary properties of the fat.

Since the trends for lard improvement do not include any marked changes in lard rendering, the changes will be considered on the basis of freshly rendered lard, whether steam-rendered, dry rendered or open-kettle-rendered. The general designation for this raw material is "settled lard," meaning that it is clear and free from suspended solids and water.

Refining

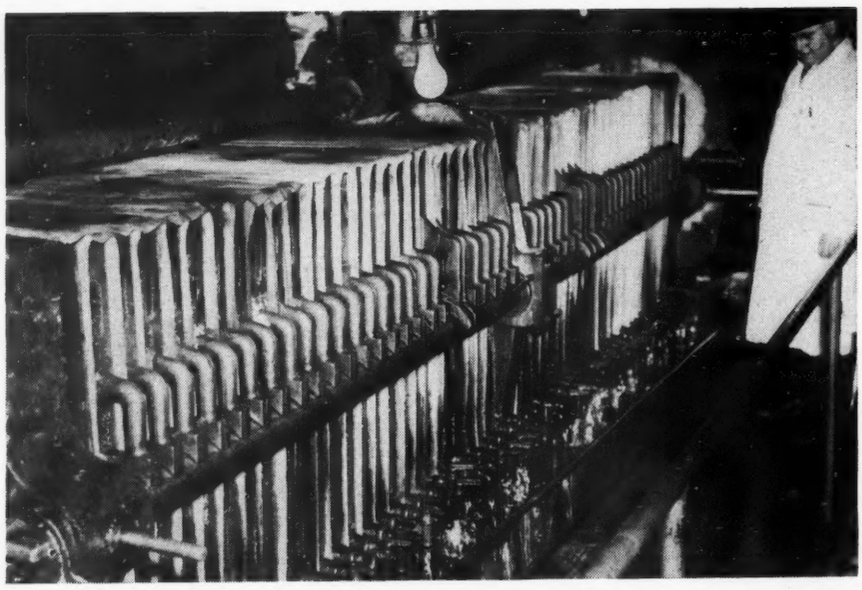
The first step in the improvement procedure is to prepare the "settled lard" for de-odorization. Preparation may be accomplished by either: (1) Bleaching with 0.25 percent of fuller's earth at 160 to 180 deg. F. for 30 min. and filtering or (2) refining with caustic soda, settling and filtering.

Caustic soda refining may be conducted by the batch or continuous method. If the quantity of lard to be refined is appreciably less than 30,000 lb. per day, the batch method is preferred, although the continuous method is the more up-to-date procedure for large quantities of fat. The refining consists of mixing thoroughly a water solution of caustic soda with the melted fat for the neutralization of the free fatty acids with the formation of soap. When the batch method is used the solution is mixed in a tank or vat equipped with an agitator. The soap separates from the fat and settles to the bottom of the tank as "foots." With the continuous method, the solution is intimately mixed with small quantities of lard by means of proportioning meters and a continuous discharging mixer. The soap is removed by centrifuging. The neutralized lard is washed with water and dehydrated during flow through a vacuum dryer.

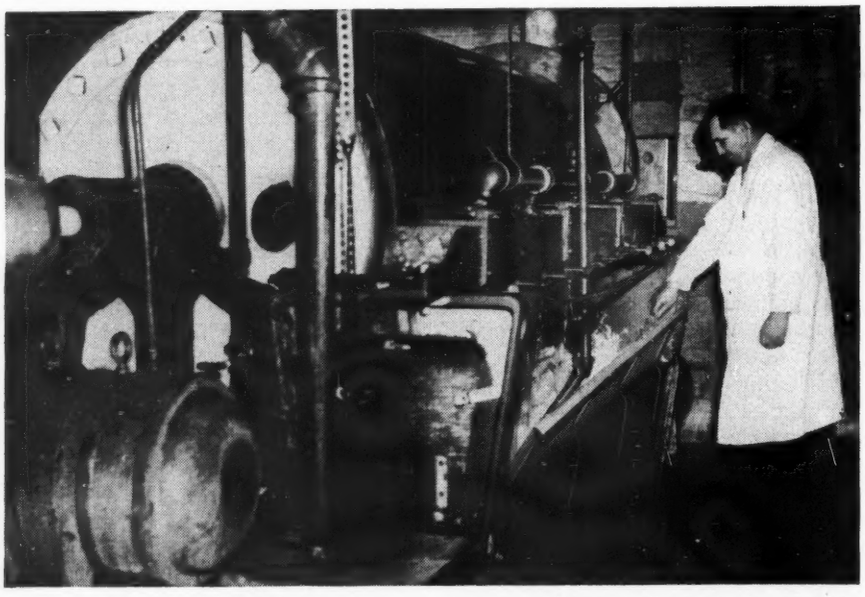
Increasing Stability

Lard made from the mixed hog fats is too soft or oily for a satisfactory shelf product. The melting point must be raised if the lard is to remain solid in unrefrigerated storage during summer months. The melting point may be raised by: (1) Hydrogenation to the desired hardness or (2) addition of a predetermined percentage of fully hydrogenated lard, known as "lard flakes," to give a blend with the desired hardness. Some lard packaged for sale in the South has its melting point raised as much as 10 and 15 deg. F. by the addition of 4 to 8 percent of "lard flakes." The addition of "flakes" has no effect on the keeping quality of the lard. For this reason, lard of this type may also require the addition of an anti-oxidant. The addition reduces the essential fatty acids content of the lard only by the percentage of "flakes" added.

Hydrogenation consists of the chemical addition of hydrogen gas to



5. FILTERING removes suspended solids and gives lard a clear, low-color appearance. Caustic soda or fuller's earth is used as a bleach before filtering.



6. & 7. CHILLING may be done in two ways: On a roll (above) where lard is beaten in a "picker box" or (below) with continuous agitation in Votator which allows direct packaging into sealed tinned cans or the readily available and easily recognized Peter's style lard cartons.

the lard and is carried out in the presence of a nickel catalyst at a temperature above 300 deg. F. Increasing the melting point of lard by hydrogenation increases also the keeping quality or stability to oxidative changes. Stability can be improved still further by the addition of an anti-oxidant. The objection to raising the melting point by full hydrogenation lies in the destruction of the linoleic and arachidonic fatty acids, which are essential for complete animal nutrition.

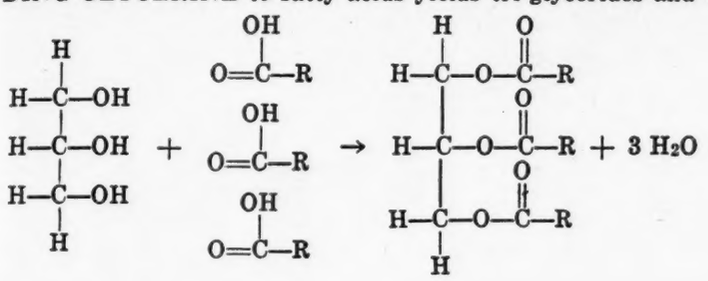
Blandness of the hydrogenated lard or of lard mixed with "lard flakes" is attained by de-odorization with steam. This treatment consists of blowing live steam through the hot lard for 2 to 4 hr. under high vacuum. Highly satisfactory results are obtained at temperatures between 375 and 400 deg. F. and a pressure of ¼ in. of mercury absolute i.e. approximately 29¾ in. of mercury vacuum. Length of treatment time to free the lard of odor and taste depends upon the amount of steam used as well as on the temperature of the oil and the degree of vacuum. If the lard has not been neutralized by caustic soda refining, the free fatty acids must be removed during deodorization to give a lard with a high "smoking temperature." Longer de-odorization time and more blowing steam will probably be required to do a good job than would otherwise be necessary.

Emulsifying Properties

Addition of a small percentage of de-odorized mono- and di-glycerides to the de-odorized lard will increase its emulsifying property. Such an increase is often desired to permit the use of higher percentages of water and sugar in certain types of cake batter. Mono- and di-glycerides are fat-like compounds in which only one or two of the hydroxyl groups of the glycerine part of the fat molecule have reacted chemically with fatty acids to leave either two or one of the glycerine hydroxyl groups unchanged. A natural fat consists mainly of tri-glycerides; all three of the glycerine-hydroxyl groups in each fat molecule have reacted chemically with a fatty acid as indicated in the equation (See opposite page).

The mono-glyceride is the one which contributes most to the increased emulsifying property of a fat. However, since di-glycerides are made with the mono-glycerides in commercial practice, the two are always used together. The probability that bland shortenings from

ADDING GLYCERINE to fatty acids yields tri-glycerides and water.



lard will contain mono- and di-glycerides depends upon the use for which the bland lard is intended.

Although de-odorization of lard does not lower its keeping quality, all de-odorized lard, with or without the addition of "flakes," must be stabilized against oxidative changes. The development of even a slight degree of rancidity is readily detectable in a bland lard. This retardation of oxidation may be accomplished by adding an anti-oxidant to the lard before packaging.

An anti-oxidant, added to the lard in a very small quantity, keeps it from becoming rancid for many months. There are, also, other chemical compounds, known as synergists, which greatly increase the stabilization of the lard when added with the anti-oxidant. The synergist makes the anti-oxidant more effective. Citric and phosphoric acids are synergists for the anti-oxidant nordihydroguaiaretic acid.

M. I. D. Approval

Since all animal fats sold in interstate commerce must be federally inspected, only those anti-oxidants which have been approved by the Meat Inspection Division of the Bureau of Animal Industry, USDA, can be used in lard sold in interstate commerce. Several anti-oxidants now on the market have been accepted by the M.I.D. Most important of these are: (a) Resin guaiac with or without citric acid as a synergist, (b) nordihydroguaiaretic acid (sold under the trade-mark "NDGA"), with or without citric or phosphoric acid as a synergist, (c) propyl gallate with or without citric acid and (d) tocopherol concentrate in vegetable oil. A mixture of propyl gallate with or without citric acid and lecithin in corn oil has the trade name of "G-4".

The maximum effectiveness may be obtained from anti-oxidants when the addition is made to the hot lard after the final filtration. After the anti-oxidant has been added to these special lards, their treatment is the same as that given any lard to be plasticized and packaged.

Plasticizing of lard consists of chilling it rapidly on a lard roll and beating it in a "picker box" (a trough-like receiving conveyor at the chilling roll equipped with an agitator consisting of spikes mounted radially and helically on an axial shaft), or by passing the lard through a Votator. The essential point, no matter which method is used, is to obtain a physical structure of the solidified fat containing trapped air that will give the desired appearance, ability to withstand separation at warm temperatures and retention of inherent culinary properties.

The final step in the making of these improved lards is packaging. Some may continue in the Peter's style lard carton because the carton is readily available and is recognized as a standard lard package. Undoubtedly most will be packaged in air-tight tinned cans although several types of cartons developed specially for lard have been tested. Other types of containers are under consideration but their development has not yet progressed far enough for prediction to be made as to when they may replace the sealed can.

Labeling or trade name identification of these improved or new lards presents a question. Some of them will probably retain the term "lard" on the label and others will be given a trade-mark name with no direct reference to lard. Whatever may be the labeling practice, all of these lard products processed under Federal inspection, as most of them will be, will have label designation that they are made from animal fats.

Also, whether these new products retain "lard" on the label or have trade-marked names, they undoubtedly will be processed to retain most of the superior shortening value and the nutritionally essential fatty acids possessed by lard itself. Changes being made in lard processing are for the purpose of creating a greater retail demand for lard without deteriorating its inherent desirable properties.

42° F. vs. 67° F.

For Keeping Prepacked Produce Fresh

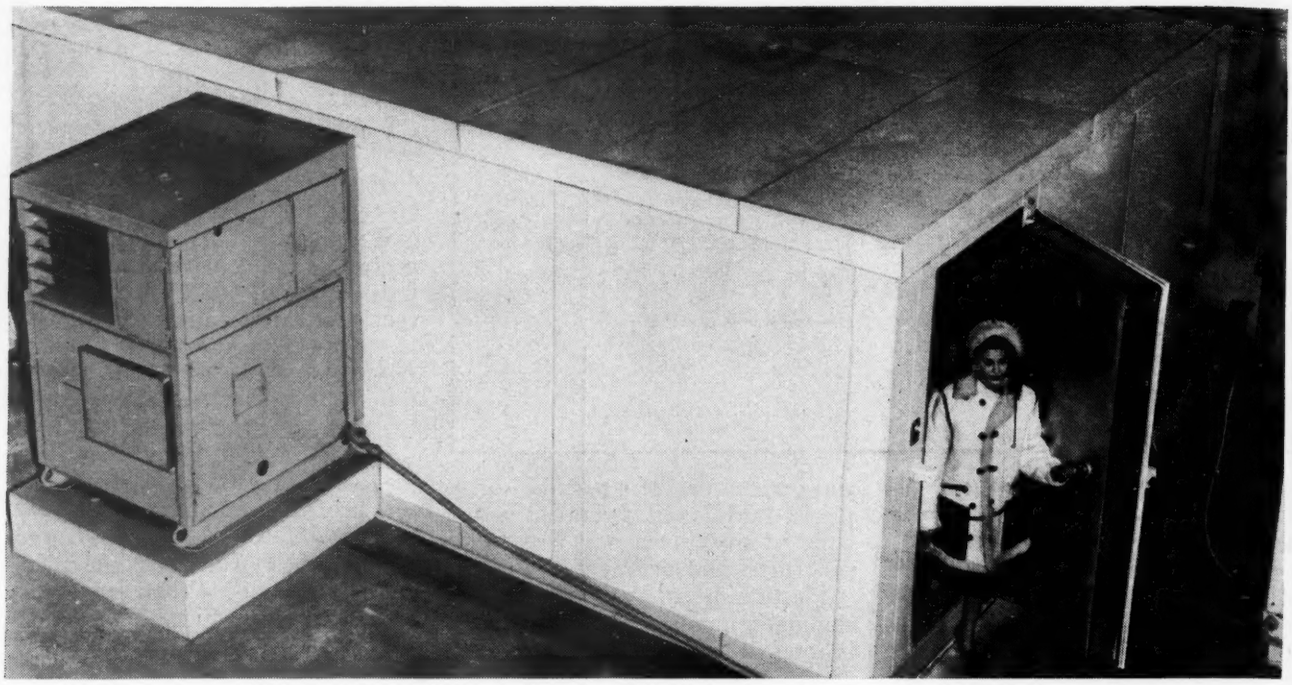
PREPACKAGED fresh vegetables held at a temperature of 42 deg. F. during marketing operations will keep from two to three times as long as those held in non-refrigerated storage.

Tests have recently been conducted on freshly-harvested Brussels sprouts, broccoli and cauliflower, wrapped in various types of transparent film and studied under market conditions. One batch of the vegetables was held at 67 deg. F., which approximates the fall and winter temperature of a market storeroom. A second batch was held at 42 deg. F., the average temperature of an ordinary home refrigerator. Unwrapped vegetables, also, were tested at these two temperatures.

After four days of storage at 67 deg., none of the prepackaged vegetables was salable. But at 42 deg., the packaged cauliflower remained fresh in appearance and satisfactory in flavor for eight days. The Brussels sprouts and broccoli remained in salable condition for as long as eleven days.

In all cases, the various types of plastic packaging film provided some protection for quality. The non-wrapped lots of vegetables lost weight rapidly.

These results were announced by transportation and storage specialists of the Bureau of Plant Industry, Soils and Agricultural Engineering, of the United States Department of Agriculture. The tests were financed by funds from the allocation under the Research and Marketing Act.



WORK ROOM, maintained at + 18 deg. F., for experimental freezing and examination of frozen foods at Georgia Tech experiment station.

Frozen Food Research Program

Project set up to study chemical and biological problems associated with

By F. BELLINGER and T. W. KETHLEY

Engineering Experiment Station Georgia School of Technology, Atlanta, Ga.

ECONOMIES and advantages of preserving food by freezing have been brought out in trade literature many times. But comparatively little work of a fundamental nature has been performed on the selection of the best freezing method for a particular food.

The present project was accordingly set up to include an investigation of problems of such fundamental nature that the data obtained could be applied later to commercial practice. Two full-time research chemists and three student chemical engineers are now working part time on the project. Engineering design and machine shop personnel of the station devote part time as required. The number of problems which can be attacked simultaneously depends upon the physical equipment and personnel available.

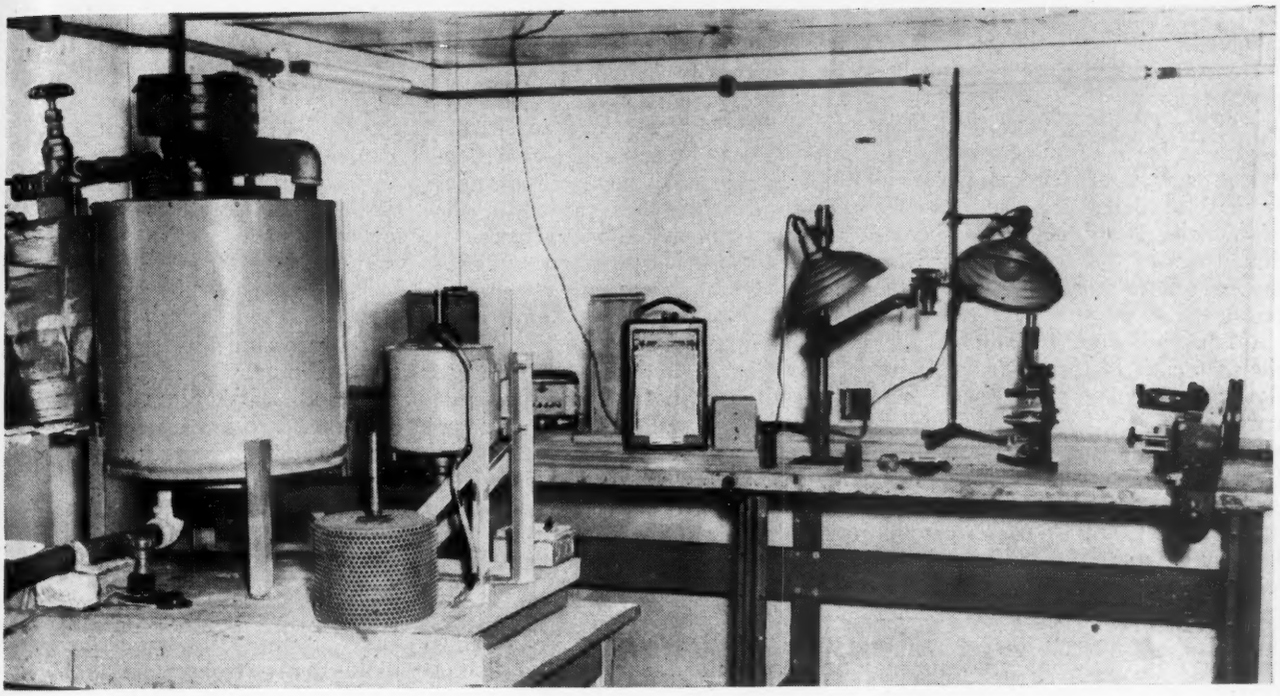
In addition to ordinary laboratory facilities, Georgia Tech has installed a storage room 9 x 12 x 7 ft. held at 0 deg. F. ± 0.5 deg.; a work room 12 x 17 x 7 ft. maintained at 18 deg. F., in which experimental freezing and examination of the foods are carried out; an intermediate storage locker 6 x 8 x 7 ft. held at about 0 deg. F., and a special dark room held at 68 deg. for use in work on color photography. Special equipment includes a spectrophotometer; an ultrasonics generating unit; a high speed temperature recorder developed to record initial temperatures of peas and other foods during processing; a unique continuous centrifuge that will receive a wire mesh box prepacked with foods, then rotate and discharge the carton, without harm to the foods; an experimental immersion freezer utilizing alcohol as the medium and having a capacity from one pea to one pint of foods with temperatures maintained within ± 1 deg. F. during freezing to as low as −20 deg. F.; and an Aminco dry ice cold box which is useful to as low as −90 deg. F.

A study of the literature is always an essential part of new research. Accordingly, a "Literature Search on the Preservation of Foods by Freezing" was prepared by the Engineering Experiment Station's Technical Information Division. It was published under that title as Special Report No. 23, in June, 1946. This report includes subject-indexed abstracts of over 2,000 technical articles and patents, copies being available at cost to workers in the field. The first supplement to this search, bringing the material up to date as of July, 1947, has recently been published. It is planned to continue the preparation of such supplements at periodic intervals. The value of these abstracts as a source from which summarizations of data on a given subject can be made is illustrated in the following paragraphs.

Blanching

A preliminary blanch or scald is necessary for successful freezing of most foods to destroy oxidizing enzymes which cause discoloration and the formation of unnatural "hay-like" flavors [610]. Blanching may be accomplished by the use of chemicals or by electronic, water, or steam heating.

The greater part of blanching research has been in the fields of water and steam heating. Over short peri-



INTERIOR of work room showing small immersion freezer (left) and equipment for recording freezing curves and photographing foods.

Is Launched at Georgia Tech

freezing of foods. Cold rooms constructed, special equipment obtained

ods of time, water is more effective than steam, but water causes an appreciable loss of ascorbic acid, hence steam blanching is preferred [1113]. There is no set standard for the time and temperature to be used on all food products. Each product has a critical temperature range at which the most beneficial results are obtained. Apparently, the desirable effects are accomplished within the first two minutes of the blanching period [767]. Unless blanching is complete, however, the activity of viable micro-organisms is greatly increased. In a test on peas [610], blanching by scalding destroyed 99 percent of the bacteria, but unless the peas were frozen promptly, the remaining one percent proliferated very rapidly. This rapid growth was due either to the increased water present or to increased microbial invasion brought about by the breaking down of normal barriers. The lower temperature limit of microbial growth appears to be between 15 and 20 deg. F.

Sulphur dioxide has been the most widely used chemical blanching agent [934]. The presence of this compound retards the oxidation of ascorbic acid, and until the ascorbic acid has been oxidized, darkening of citrus juices does not occur. Apple slices dipped for one minute in a sodium bisulphite solution, having a concentration equivalent to 0.2 to 0.3 percent SO_2, exhibit no tendency to discolor, but a delay of 8 hr. following the dip is recommended before freezing [193]. A 2-min. dip in a 0.1 percent thiourea solution [936] has been found effective in retaining the color of the foods. The use of this compound, however, has been discouraged by the Federal Food and Drug Administration.

Relatively little work has been done with electronic blanching. Mayer reported satisfactory results using a 750 watt oscillator and 150 megacycles [1162]. Schelle blanched peeled potatoes in a 12 kw, 0.25 megacycle unit [1366]. Advantages of uniform heating, reduced losses of soluble solids and vitamins, and better flavor retention are claimed for electronic blanching.

Because of their mutual interest in the development of industry and agriculture in the South, the TVA and Engineering Experiment Station of the Georgia School of Technology have established a long range program of research on the fundamentals of food preservation by freezing. In this article, the scope of the program is outlined and some discussion of the principal phases of the work is presented. It is concerned with the problems of blanching, the selection of media for immersion freezing, and histological and colloidal changes during freezing and storage. Reference numbers in this article apply to abstracts contained in a literature search prepared for the project. Interested workers in the field may obtain copies of these abstracts at cost from the Engineering Experiment Station, Georgia Tech.—The Editors.

Enzymes Involved

In order to establish a blanching process on a sound basis, it is desirable to know the nature of the enzymes, or other agencies involved, and the type of changes brought about in the product. Kohman [971] believes that changes in flavor are caused by a process of anerobic respiration and more directly by respiratory enzymes. Barker [324] speaks of the process as autolysis. Tressler [1502] believes that the reactions are both oxidative and hydrolytic in nature, and hence, that enzymes

such as catalase and tyrosinase are involved.

Because of the close relation between respiratory enzymes and catalase and peroxidase, these have been used as a basis for determining enzymatic activity. Hydrogen peroxide is used to determine the presence of catalase. Both guiacol and benzidine are used for peroxidase; these tests are more reliable than the catalase tests.

Campbell's work [463] indicates that the enzymatic factors responsible for flavor and color changes are not completely or permanently inactivated by blanching. Catalase, inactivated by heat, has been found in scalded and cooled peas ½ hr. after scalding. Peroxidase activity, qualitatively determined, has been found in peas blanched in accordance with current industrial practice, after storage for several months in air at −5 deg. F., although the enzyme present had not caused any undesirable changes in quality.

The presence of acetaldehyde should be an index to anerobic respiration as it is formed during the process of respiration. However, acetaldehyde has been found in stored peas, probably formed by enzymatic activity during storage, since raw shelled peas and freshly blanched peas contain no acetaldehyde [292,1301].

Color Changes

Color changes in beans and peas are due not only to oxidation by enzymes, but also to formation of pheophytin by the removal of magnesium from the chlorophyll molecule. Under open light, the food will become brown when the proportion of pheophytin is sufficiently high to reduce the total luminosity in the green and blue range to a magnitude comparable with that in the red and yellow. Blanching removes air and other volatile substances from the parenchymous cells and replaces them with water. The translucency of a tissue is a rapid indirect measure of the inactivation of the enzymes and the softening of cell walls [540].

Fluid blanching causes a reduction in the weights of vegetables and a sharp increase in the specific gravity. This means a considerable shrinkage in volume due to expulsion of gases and collapse of tissue. Therefore, a greater weight of food can be packaged in a given container. Diehl [610] observed no marked alteration in the dry matter, carbohydrate, or other extractable matter when peas were blanched for 85 sec. with live steam or boiling water.

Balls [314] has suggested that protein associations of the enzyme may be temporarily halted by heat, but that the proteins may be reconstituted after a time. As a result, the activity may be resumed or even enhanced by environmental changes which the heat has caused in the tissues. Gramenitski and Meyake [610] have stated that the presence of proteins, or salts, and other colloidal substances, acting as protective agents, may shield the enzymes from the action of heat. At some future time, the enzymes may again become active. The mechanism of the renewal of potency is not understood.

Considering the typical examples of the literature on blanching which are described above, it is obvious that much more work is needed to establish the nature of the reactions involved. It is believed that most products are overblanched in order to be on the safe side and that a study of the time-temperature-enzyme activity relationships should yield results of immediate practical application.

Immersion Freezing

Attempts to freeze foods more rapidly without resorting to very low temperatures led to the development of the immersion method of freezing. Freedom from defrosting operations and other advantages are obvious. The immersion medium should be economical and edible, should possess a freezing point below 0 deg. F., and should have a low viscosity and high thermal conductivity in the operating range [1633].

Brine solutions have been used for freezing fish and other foods where a salty taste is not objectionable [1447]. Otteson [1784] precooled fish to just above the freezing point before immersing in cold brine. In this way a coating of ice formed on the fish almost immediately and prevented penetration of the salt during subsequent freezing. Oguna [1810] coated foods with a water immiscible fatty substance prior to immersion in brine. H. A. Noyes [2039] patented a solution of 10 to 18 percent salt and 20 to 36 percent sugar. He claimed that this solution was free from a salty or bitter taste. A physiologically balanced salt mixture of 74.5 percent salt, 7.5 percent potassium tartrate, 8 percent magnesium lactate, and 10 percent calcium lactate was devised by Wolf [1950].

Sugars have been widely used for freezing of fruits. They impart added flavor and inhibit oxidation which would have caused loss of color and flavor. To overcome the high viscosity of sucrose solutions, Taylor [1488] used a 57 percent solution, the solids of which were a mixture of 10 percent sucrose, 54 percent levulose and 36 percent dextrose. The solution freezes below 0 deg. F. and has a viscosity of 500 cps. at 5 deg. F. Taylor also inverted a sucrose solution and neutralized the acid inverting medium to such a pH that the solution prevented discoloration of certain acidic fruits and vegetables [2088].

To overcome dilution of the freezing medium by food juices, Woolrich and Bartlett [1663] developed a polyphase process using a dextrose, sucrose and water mixture. The mixture is cooled under agitation until solid ice particles are dispersed throughout the medium. Upon immersion, the surface juices are reported to freeze so rapidly that dilution of the solution does not occur. A study of the development of molds in invert sugars has been made by Woodroof [1633]. Where the sugar concentration is maintained above 50 percent, mold formation is negligible. The protective properties lie in the high osmotic pressure of the sirup which plasmolyzes the organisms by drawing out the water.

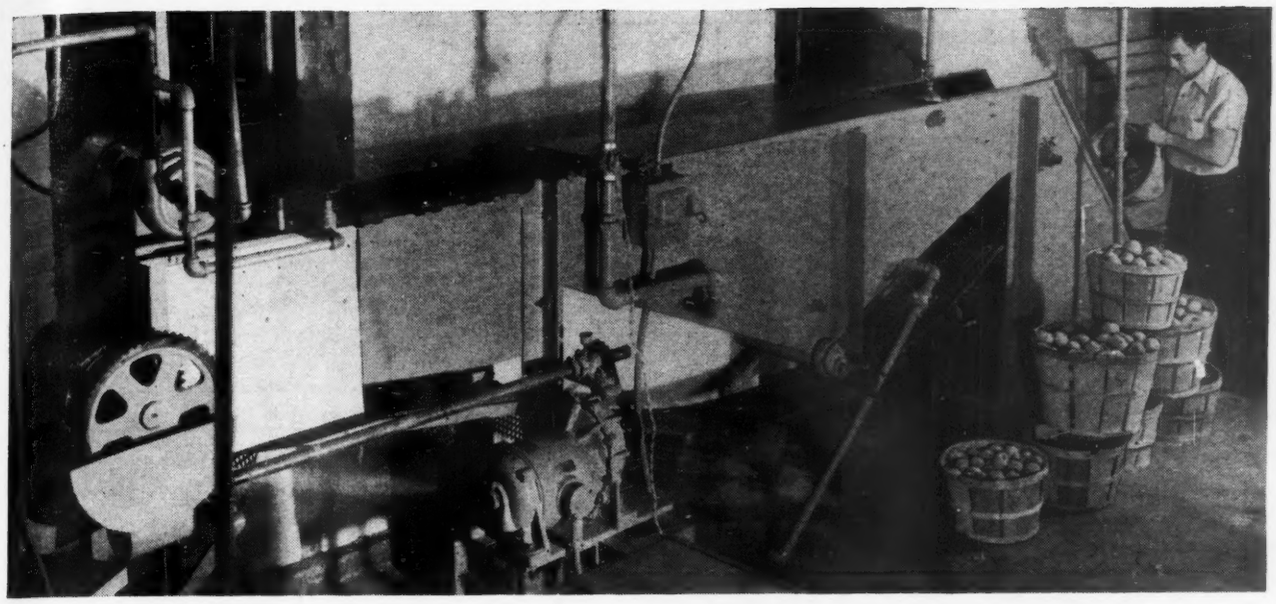
Low Boiling Materials

The use of a low boiling material, at both atmospheric and elevated pressures, has received attention. In Germany, food has been frozen by immersion in liquid nitrous oxide at −130 deg. F. On warming the frozen food to a storage temperature of 0 deg. F. the adherent nitrous oxide vaporizes. The food products were not found to be superior to those frozen by good commercial methods, but certain economic advantages are claimed [1054,949a], which depend upon a source of low cost nitrous oxide.

Bland [90,91] utilized a mixture of 32 percent glycerine, 30 percent ethyl alcohol and 38 percent water; this mixture is still fluid at −40 deg. F. and is reported to be tasteless, odorless and harmless. Bottoms [1965] froze liquid materials by admitting them into a chamber, together with a liquified refrigerant such as propane, in such proportions that the refrigerant was totally vaporized and the liquid food completely frozen. Atwell [1917] also patented the use of propane as a refrigerant in a closed system at such a pressure that the propane boiled at −20 to −40 deg. F.

The problems relevant to the histological structure of frozen tissue are: The question of ascertaining where ice forms with respect to constituent muscle fibers or cells when

(*Continued on page 202*)



EXPERIMENTAL RUNS in this draper type scalder equipment gave information on the lye peeling of fruits and vegetables.

SPECIAL FOOD INDUSTRIES REPORT ON . . .

PEELING WITH LYE*

Method is suitable for peeling all sizes, shapes, varieties of peaches, pears and root vegetables. Removes bruised and rotten tissue in addition to peel

By J. G. WOODROOF, S. R. CECIL, ETHYL SHELOR and IDA A. CECIL,
Georgia Agricultural Experiment Station, Experiment, Georgia.

AN alkali solution (lye) is excellent for disintegrating the peel of most fruits and vegetables for canning, freezing or dehydration. With the exception of apples, tomatoes and a few others, it will remove the peel of fruits and vegetables more satisfactorily than steam or hot water. Steam or boiling water will loosen the peel of very ripe or shriveled peaches, new white potatoes or freshly dug sweet potatoes.

Freshly picked peaches grown in a humid climate, that are yet firm, unshriveled or unmellowed, cannot be satisfactorily peeled with steam or hot water. Pears, and cured white or sweet potatoes, are peeled with difficulty with heat alone. By properly controlling the time, temperature and concentration of the lye solution, not only these crops, but carrots, beets, certain varieties of figs, and others may be easily and economically peeled with lye.

Contrary to the belief of many, the quality of lye-peeled fruits and vegetables is just as high as those peeled by other methods. Poor quality of lye-peeled products, that were thoroughly washed and acid rinsed, could be traced to causes other than the presence of lye.

Experimental results from peeling peaches and sweet potatoes with lye, with steam, and by hand, showed that the yield of finished product was practically the same. When peeling, washing and trimming were carefully done there appeared to be no advantage or disadvantage in lye-peeling, in so far as peeling loss was concerned. When improper equipment was used, however, or when the best procedures were not followed, heavy losses occurred.

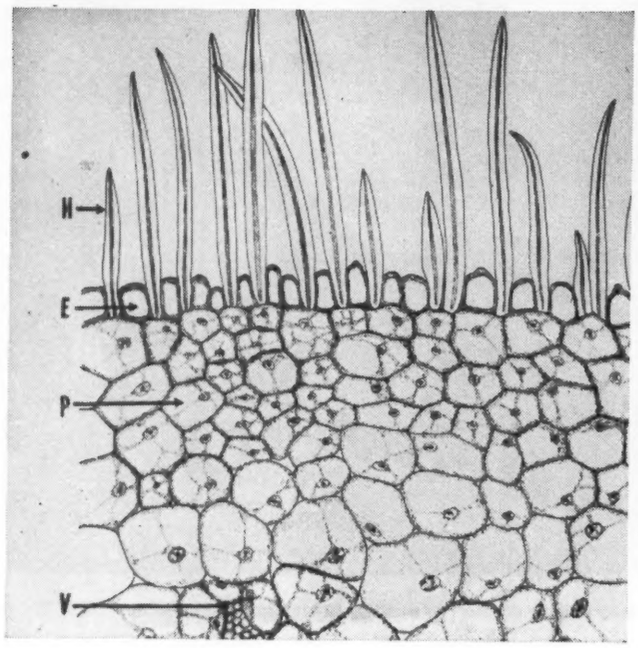
The peel or skin can be more easily removed with lye during the first two days after harvesting. With delay, the skin of peaches and pears toughens, that of root crops become thicker with the formation of cork, and the penetration of lye is made more difficult.

History of Lye Peeling

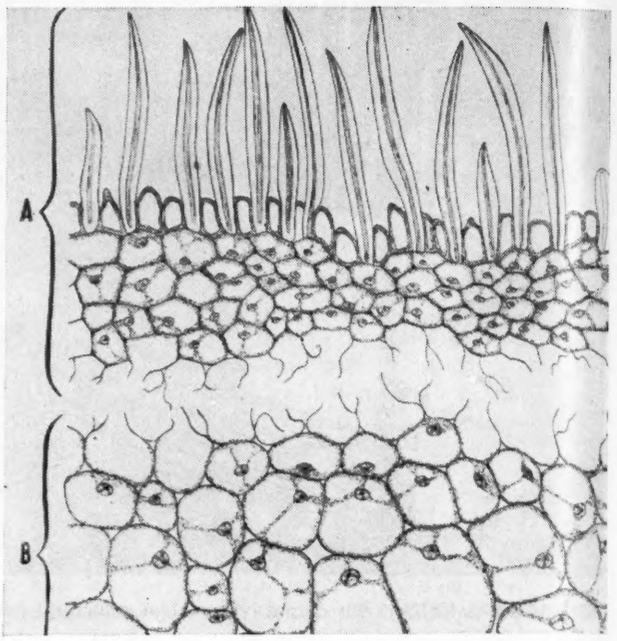
The use of lye in the preparation of foods is of ancient origin. For centuries the bitterness of olives has been removed by the use of lye ashes or quicklime[14]. Before the first white settlers came to America the Indians used wet ashes, and water in which ashes had been soaked, to decorticate the grains of corn. This primitive method of making lye hominy was adopted by the immigrants who later improved upon the method of obtaining the lye and treating the corn [14, 18]. The use of lye for removing the husks of the corn is still used in canning establishments where lye hominy is being produced.

* Results of 8 years of research in cooperation with the Tennessee Valley Authority and The Solvay Process Co.

Structure of Peach Peel and Tissue Beneath Affect Lye Penetration



FUZZ (H) and epidermal cells (E) inhibit lye penetration. Parenchyma cells (P) disintegrate and allow the peel to slip off.



CELLULAR structure of peach, showing how the peel (A) separates and slips off the peach (B) after being treated with hot lye.

Lye has been used for removing the peel of such fruits as figs, peaches, pears and apricots for canning. Gould[7] stated that the skins of figs could be removed by dipping in a boiling solution of lye for a few seconds, followed by thorough washing in water. He recommended a concentration of one lb. of lye to 10 to 12 gal. of water. Peaches for canning and dehydration were peeled by immersing in lye according to several investigators [2, 3, 12, 15]. Stanley [15] and Caldwell[2, 3] recommended one lb. of lye to 10 to 16 gal. of water and an immersion period of 30 to 90 seconds. Nichols et al[12] recommended a one to three percent solution at 190 to 200 deg. F. with an immersion time of 15 to 45 seconds. Woodroof[19, 20] stated that peach tissue heated to 140 to 158 deg. F. browned on the surface more rapidly and more intensely than tissue heated above or below that temperature. To peel peaches for freezing he advocated the use of a 10 percent lye solution at a temperature of less than 140 deg. F. followed by rinsing in 3 percent citric acid solution. In 1947 Woodroof and his associates[22] stated that laboratory tests and experience in commercial plants had shown that the "most dependable peeling is with a solution of 6 to 8 percent lye containing one percent of a good detergent and 0.1 percent of a good organic wetting agent."

Joslyn and Marsh[9], in a study of the effects of lye peeling on the browning of peaches, found that a 10 percent concentration at a temperature of 140 deg. F. for 2 min. and a 3 percent citric acid rinse gave satisfactory results. The U. S. Bureau of Agricultural and Industrial Chemistry[1] reported that peaches for freezing should be peeled by dipping in a 2 to 5 percent solution of lye at 180 deg. F. for 45 to 90 sec. and then washing in cold water.

DuBois and Colvin[5] reported that the retention of ascorbic acid, which had been added to peaches for freezing, was ineffective unless all lye used for peeling had been removed. It was noted in the retention of the added vitamin C that steam peeling had some advantages over lye peeling, and that a 2 percent citric acid rinse had a slight advantage over the thorough wash in water.

Peeling Vegetables

Lye has been used for the peeling of vegetables as well as for fruit. Havighorst[8] stated that carrots for dehydration were peeled in a boiling lye solution of 5 percent concentration with a dipping period of 2 min. 40 seconds. Stateler[16] reported that carrots could be peeled in 70 sec. when subjected to an 18 percent caustic solution at a temperature of 218 deg. F.

Mazzola[11] found that a lye solution of 53 percent concentration would peel potatoes in 10 sec. with a waste of only 7 percent. At a concentration of less than 20 percent the waste was much greater.

Dunlap[6] indicated that potatoes peeled satisfactorily when submerged for approximately 2 min. in boiling lye at a concentration of 14 percent. This type of peel decreased the waste without an increase of labor. According to Thurber and Bohne[17], a rotary lye peeler would peel Irish potatoes in 1 to 1½ min. and sweet potatoes in 2 to 3 min. when a lye concentration of 25 percent or more was used. Woodroof and Atkinson[21] stated that sweet potatoes were successfully peeled in a boiling lye solution of 7 to 10 percent in 5 to 6 minutes.

They found the depth of penetration of the lye could be controlled by the concentration of the solution, the temperature, and the time of immersion, and that thorough washing to remove all traces of lye was necessary to prevent a deep blue-green discoloration.

Culpepper et al[4] claimed that lye peeling of pumpkin and winter squash would greatly reduce both the labor and the loss in preparation. They stated that even the harder shell varieties, if harvested before the shell became too hard, could be lye peeled. A 6 to 8 min. immersion in a 10 to 12 percent solution at a temperature of 200 to 205 deg. F. was found satisfactory.

Olsen[13], after a study of the addition of alkyl aryl sulphonates to lye in peeling peaches, reported that the time of peeling decreased as the concentration of the lye, the temperature of the solution, or the

Lye Peelers are Built in Three Types: Scalder, Spray and Mill-Wheel

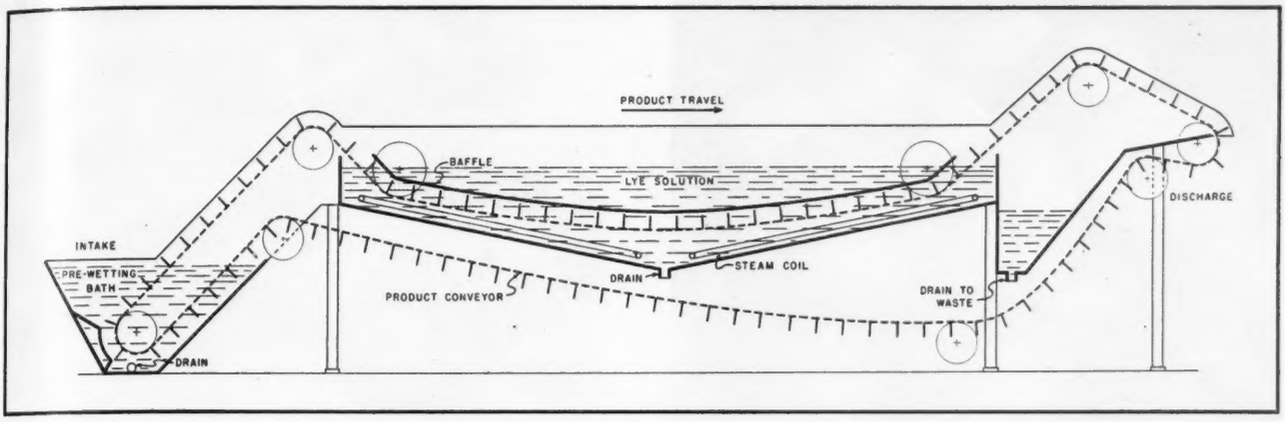


FIG. 1. DRAPER-TYPE SCALDER consists of a V-bottom tank containing closed steam coils, a product conveyor, a baffle to hold products under surface of lye, a small pre-wetting bath and an overflow tank to catch the lye that drains from scalded products.

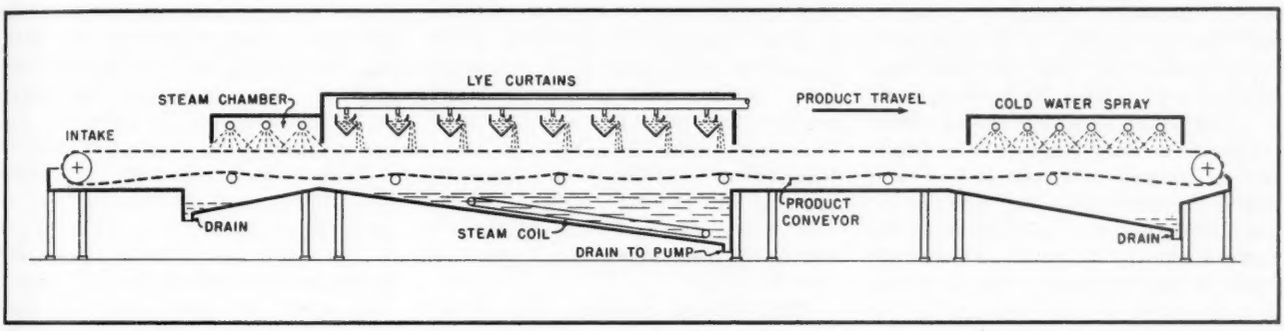


FIG. 2. LYE-SPRAY SCALDER. Products are preheated in steam chamber, sprayed with lye, drained and washed in continuous operation.

concentration of the wetting agent increased. He gave the optimum concentration of either lye or acid for peeling as 10 percent; the optimum temperature as 140 deg. F.; and the optimum concentration of the wetting agent as 0.5 to 0.8 percent. Lankler and Morgan[10] found, that when 0.5 percent alkyl aryl sulphonate was added to a lye solution of 36 percent concentration, there was a reduction in the immersion time by as much as 20 to 40 percent. They peeled peaches, pears, potatoes, carrots, beets, turnips, parsnips and celery roots.

Lye Peeling Equipment

Equipment for lye peeling consists of a means of immersing the product in a hot lye bath (scalder) or of spraying lye on the product for a definite length of time; a means of draining the excess lye from the product, and a means of washing away the lye and disintegrated peel. The equipment may be small enough to handle a few pounds of product in the kitchen or large enough to peel 1,200 bu. per hr. in a commercial plant. Commercial units should be equipped with thermostats, lye concentration indicators and speed controls.

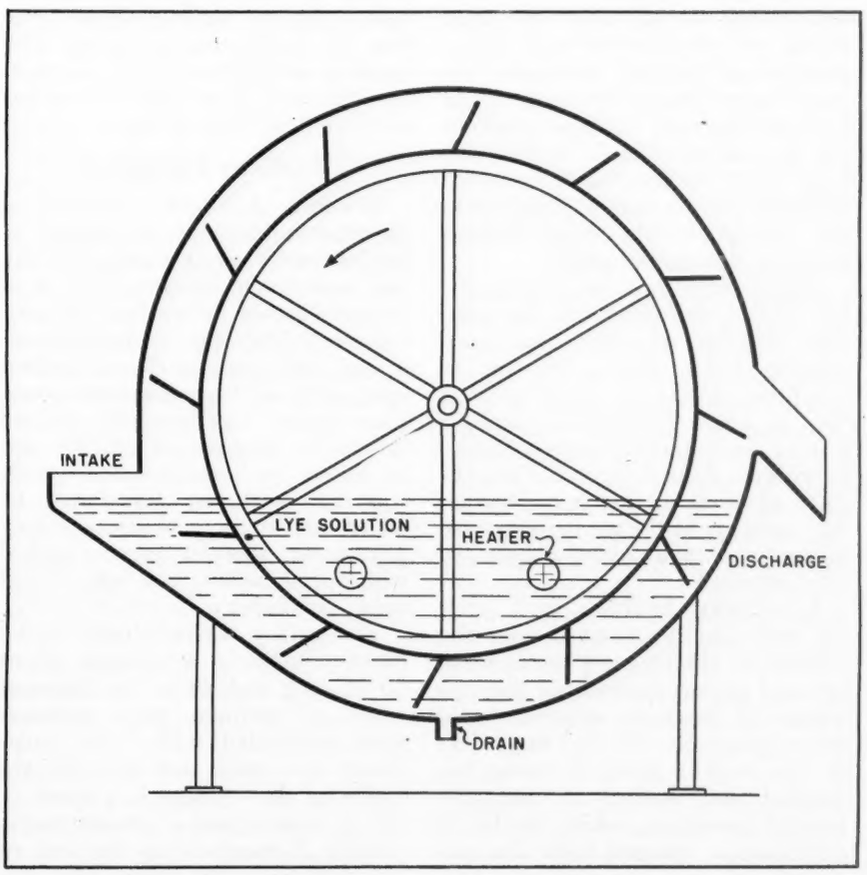
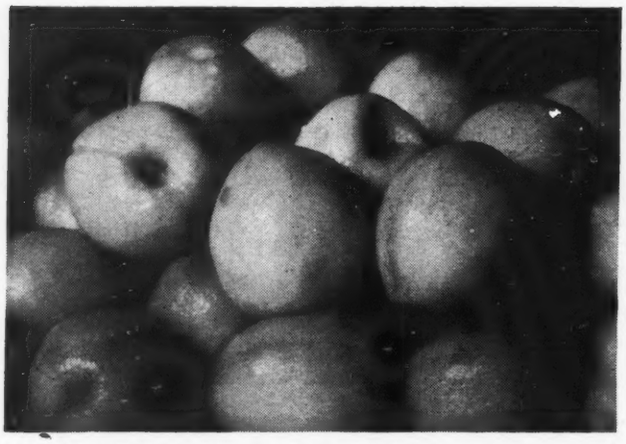


FIG. 3. MILL-WHEEL SCALDER. Products are held under the lye by a revolving wheel.

Strength and Temperature of Lye Determined by Final Processing



FOR FREEZING, peaches should be peeled whole in 8 percent lye at 150 deg. F., for 2-3 min., washed and dipped in citric acid.

FOR CANNING, peaches are halved and pitted, then peeled in boiling 5 percent lye for 2 min., and thoroughly washed.

Draper-Type Scalder. The preferred means of treating products with lye for peeling is in a draper-type scalder, see Fig. 1. This consists of a vat about 30 ft. long, with a V bottom, containing closed steam coils for heating the lye. The product is carried on a belt and is held under the surface of the solution by slats or deflectors. In addition to the tank there is a small pre-wetting bath at the entrance, and provision for drainage of the product at the other end. The capacity may be increased by increasing the width of the vat and conveyor belt. A unit with a belt 40 in. wide will scald 20 bu. of peaches per min. Since cured sweet potatoes and pears require longer treatments, only about half this quantity of these products can be scalded. The V bottom and large drain is for the purpose of draining off the heavy sediment in the bottom of the tank without dumping the entire batch.

Open steam coils for heating the lye are not recommended. The constant addition of water from condensing steam causes the vat to overflow constantly, resulting in a loss of about 15 percent alkali, a loss of heat, and a needless hazard to workers around the vat. The constant addition of steam condensate and overflow of the vat increases the difficulty of maintaining proper lye concentration.

Lye-Spray Scalder. For peeling with the lye-spray scalder the product is spread on a metal mesh belt and passed successively through a steam chamber, lye sprays and cold water sprays. See Fig. 2. The product is pre-heated, sprayed with lye, drained and washed in one continuous operation, while the lye is continuously pumped from the coil-heated vat onto the products. Disadvantages of this method of scalding are: (a) At least 4 times the belt surface area is needed to scald a given quantity of product, as it cannot be piled more than one layer deep, while with the draper-type scalder the product may be piled four-deep, and (b) there is more mechanical trouble from repumping the lye through spray nozzles, and from the pressure pump on the water line to get a high pressure for washing.

Mill-Wheel Scalder. This is an immersion scalder in which a large wheel replaces the endless belt, as shown in Fig. 3. The product is held under the surface of the solution by the revolving wheel. The heating arrangement and controls for this type of scalder are similar to those described above.

Auxiliary Equipment

Washer. Adequate washing is an important part of lye peeling, as the lye continues to disintegrate the peel and tissue beneath until it is removed either by washing or neutralizing. After the lye has disintegrated the peel, rendered bruised spots soft, and loosened rotten areas, these issues, together with the lye should be removed as quickly and as gently as possible. For gentle washing, with an abundance of water and slight rubbing, a rotary (drum or squirrel cage) washer with spiral baffles, has been found most satisfactory.

The rotary washer found to be most suitable is a cylinder about 16 ft. long and 26 in. in diameter, made of medium gage, stainless steel perforated with ½-in. holes placed 2 in. apart each way. On the inside of the cylinder is a spiral of 1½-in. rubber hose or smooth metal, making 7 rounds from one end of the cylinder to the other. The purpose of the spiral is to control the time required for the product to pass through the washer, and to produce added abrasion by causing the pieces to rub against one another. Such a washer may serve as an elevator of the product, and has a capacity of 10 bu. per minute.

Water for washing lye-treated products should be supplied by at least 48 spray nozzles, attached to a 2-in. pipe near the center of the drum and extending the full length. The water pressure should be high enough (at least 100 psi.), and the spray fine enough so that a mist or fog will rise from the washer while in operation. To insure thorough washing, and at the same time avoid over-washing some areas, the product should be completely turned at least twice during washing.

Acid Rinser. Lye peeled products, even after thorough washing, usually retain small amounts of lye on the surface, in sutures or in depressions. It is both more efficient and more economical to remove this trace of lye by neutralizing with acid than by prolonged washing or soaking. For this reason a rinsing bath containing 2 percent citric or phosphoric acid should immediately follow washing. The acid rinser consists of a vat placed between the washer and inspection table, through which the peeled and washed products pass for a few seconds. Usually about 1-lb. of citric acid is used for rinsing 1,000 lb. of peaches. When the peaches are very soft or when washing is less efficient about twice this amount of acid is required.

In order that alkali peeling operations function smoothly and economically during a continuous run, the lye must be maintained within certain limits of concentration. Commercial experience and laboratory tests have indicated that 6 percent is the optimum concentration

for peeling peaches and fresh sweet potatoes, and that 9 to 10 percent is satisfactory for white potatoes, pears and cured sweet potatoes. Figs, carrots and beets, require concentrations much weaker, the optimum varying with each product.

Data in Table I show the results of allowing lye concentrations to vary widely for peeling Elberta peaches. With firm, easy-to-peel peaches, lowering the concentration from 8.1 to 2.6 percent resulted in an almost triple peeling time, with about twice as much peeling loss. Raising the concentration to as high as 39.6 percent resulted in progressive increases in peeling time up to about 60 percent increase, and in peeling loss up to 100 percent increase.

Soft Peaches Difficult

With soft peaches, which had bruised and injured spots and were therefore very difficult to peel smoothly, the results were about the same, although variations were of slightly different order. Peeling time was lowest at 14 to 20 percent, while peeling loss was lowest at around 10 percent. For both types of peaches, increases in concentration resulted in progressively greater alkali consumption, the amounts at 40 percent being about 4 times as high as at 6 percent. These results were obtained from laboratory tests, which were varied as desired without regard to loss of product or alkali.

In order to prevent wide fluctuations under commercial conditions, it was found that the lye concentration should be checked at least once every hour and adjusted as necessary. Instruments for reading concentration through electrical conduction were available in most of the plants studied. The solutions were titrated or checked colorimetrically with a test kit prepared for the range used.

Solution Level Important

It was found that the solution level, as well as concentration, must be maintained, since each peach or potato carried out a small amount of solution. On a commercial run of 250 hr., with a 7,000-lb. lye vat which peeled an average of 13,000 lb. (260 bu.) of peaches per hr., it was necessary to add 3 lb. of alkali and 6 lb. of water per 1,000 lb. of peaches peeled in order to maintain solution level and concentration of 6 percent. In other terms this amounted to 15 lb. of alkali and 30 lb. (3.5 gal.) of water per 100 bu. of peaches, or 40 lb. of alkali and 75 lb. of water per hr. for this particular run. With field run sweet potatoes, processed at the rate of 2,200 lb. per hr. for 50 hr., through a 3,000-lb. vat, the water added was in about the same ratio as for peaches. It was necessary to add 12½-lb. of alkali for every 1,000 lb. of potatoes peeled (or 62½ lb. per 100 bu., or 27 lb. per hr.) to maintain solution level and a concentration of 10 percent.

With small sweet potatoes, peeled in a 9,000 lb. open-coil vat at the rate of 5,700 lb, per hr. for 180 hr., no water was added since the condensed steam caused the vat to overflow about 350 lb. per hour. It was necessary to add 21½ lb. of alkali for every 1,000 lb. of potatoes peeled (or 107½ lb. per 100 bu., or 122 lb. per hr.) to maintain concentrations at 6 percent. Fourteen percent of the alkali was lost in this plant through overflow of lye from the vat.

These data illustrate the necessity for some systematic means of maintaining proper lye concentration and volume.

Maintaining Temperature

The purpose of heating the lye bath is to increase the speed of action and thereby reduce the time required for disintegration of the peel. High temperature does not injure most products, and since peeling as quickly as possible is desired, the lye solution is usually held at boiling temperature, 215-220 deg. F. This is true with white potatoes, sweet potatoes, pears and peaches for canning.

Peaches for freezing are thoroughly ripe and quite soft. Heating causes them to become more soft. Heating above 145 to 150 deg. F. produces dark brown "heat rings" immediately beneath the surface. Such rings are caused by heat rather than the lye, as is generally thought. Hand-peeled peaches immersed in clear boiling water for 2 min. developed typical heat rings. A heat ring shows up when a raw peach, which has been heated above 150 deg. is cut in cross section. When exposed to the air a few minutes the surface, to a depth of about 1/16 in., appears dull, pale and cooked. Immediately beneath appears a brown layer, about ⅛ in. deep, that was subjected to sufficient heat to stimulate rapid browning. It has a semi-cooked flavor. Beneath the brown ring is normal, raw, peach tissue. This sub-surface browning is very objectionable in frozen peaches, but since peaches for canning are thoroughly cooked, almost immediately, it shows up very little.

As shown by data in Tables II and VI, the temperature of the lye bath influenced the time required for peeling, the peeling loss and the amount of alkali used. The optimum temperature for peeling peaches for freezing was 150 to 160 deg. F., and for peeling peaches for canning was from 215 to 220 deg. F.

Penetration of lye through the peel of the peach was too slow and uneven at a solution temperature of 140 deg. This resulted in an increase in peeling time, peeling loss and alkali consumption. The lowest temperature for efficient peeling was found to be 150 deg. This could be raised to 160 deg. if the time was reduced so that the inside portion of the peach did not get above 145 deg. At 160 deg. the operation apparently reached its peak, for at 170 it was found to be impossible to lower the peeling time enough to prevent heat rings and still obtain a good peel. Peeling loss and alkali consumption dropped progressively with increase in temperature, because more and more of the peeling action was due to heat instead of chemical disintegration.

Under commercial conditions, the temperature is often allowed to rise without decreasing the peeling time. This results in increased peeling loss from the combined action of the lye and the heat. Conversely, lowering of temperature results in inadequate peeling. Hence it is seen that for a set time and concentration, efficient peeling of peaches was not obtained with total temperature variations of more than 10 degrees.

Other Products

For peeling other products that were not so sensitive to heat, or from which the peel was harder to remove, higher temperatures were used to speed up the operation. It was found that sweet potatoes required at least 210 deg. for efficient peeling, and most commercial processors maintain their lye at between 210 and 220 deg. F. The potatoes were always cooked during processing, regardless of the finished product in which they are used, so excess heat did not damage them as it did peaches for freezing.

Variations in grade and size of sweet potatoes were met in one of two ways. Lye concentration was varied, without much variation in temperature, or the concentration was maintained and the temperature increased. For example, sweet potatoes 2 in. in diameter or smaller were peeled in 6 percent lye at

Lye Concentration and Bath Temperature Affect Peeling Time and Loss

TABLE I

EFFECT OF LYE CONCENTRATION on the Peeling of Peaches at 160 deg. F.

Lye concentration percent	Peeling time minutes	Peeling loss percent	Alkali consumed lb. per 1,000 lb.
A. Firm peaches, easy to peel			
2.6	5.00	16.9	2.15
4.7	2.00	9.2	2.59
8.1	1.75	8.0	7.44
18.9	2.00	12.4	10.75
32.2	2.25	13.0	17.03
39.6	2.75	16.0	28.90
B. Soft, uneven peaches, hard to peel			
1.8	6.50	27.5	4.54
3.9	4.00	27.0	2.09
5.9	3.25	26.5	6.33
7.8	2.50	26.0	9.93
9.8	2.25	24.0	12.20
14.7	1.75	26.0	17.72
19.8	1.75	30.0	18.94
29.4	2.00	36.0	26.20
39.4	5.00	41.0	28.50

TABLE II

EFFECT OF LYE BATH TEMPERATURE on Peeling Loss of Elberta Peaches. Six Percent Lye Used.

Temperature deg. F	Peeling loss percent
Whole peaches immersed for 2 minutes	
140	10.0
150	10.6
160	12.3
170*	13.4
Peach halves sprayed 1.25 minutes	
145	19.8
160	21.7
170*	22.6
180*	24.5
200*	32.7

* Objectionable heat rings on peeled peaches when prepared for freezing.

TABLE III

INFLUENCE OF IMMERSION and Draining Time (Air Exposure) on Peeling Loss and Drainage of Lye from Hiley Peaches Peeled in 6 Percent Solution at 160 deg. F.

Immersion time seconds	Draining time seconds	Peeling loss percent	Caustic on peach surface after draining** lb. per 1,000 lb.
45	45	9.8*	2.3
45	60	11.5	2.2
45	90	12.5	2.1
60	10	10.0*	3.1
60	30	10.5	2.0
60	60	12.3	1.9
60	90	14.0	1.7
75	10	12.8	3.3

* Uneven peeling.

** Determined by measuring the amount of caustic which could be washed into a weighed amount of water by a standardized washing technic.

TABLE IV

INFLUENCE OF IMMERSION TIME on Peeling Loss of Peaches Peeled in 6 Percent Lye at 155 deg. F.

Immersion time minutes	Peeling loss percent
Golden Jubilee peaches	
1.10	9.7
1.20	11.0
1.30	12.0
Elberta peaches	
1.00	4.6
1.25	8.1
1.50	9.0
1.75	9.8
2.00	10.9
2.25	12.5
2.50	14.0
2.75	15.4
3.00	17.0

TABLE V

INFLUENCE OF IMMERSION TIME on Peeling Loss of Sweet Potatoes Peeled in 10 Percent Lye at 210 deg. F.

Peeling time minutes	Peeling loss percent
Uncured potatoes	
3.50	11.0
4.00	12.3
4.50	13.2
Cured potatoes	
5.00	11.5
5.50	12.3
6.00	12.9
6.25	14.0
6.50	15.2
7.00	15.7
7.50	16.7

TABLE VI

EFFECT OF LYE BATH TEMPERATURE on Peeling Time, Peeling Loss and Alkali Used.

Temperature deg F.	Time min.	Peeling loss percent	Alkali used lb. per 100 lb. peaches
Elberta peaches			
140	3.50	13.2	6.6
160	1.75	12.6	5.7
180*	1.25	11.9	4.3
200*	0.75	10.3	4.1
Hiley peaches			
160	1.50	9.8	3.6
180*	1.00	8.7	3.5
200*	0.50	8.2	3.3

* Objectionable heat rings on peeled peaches when prepared for freezing.

TABLE VII—ALKALI REQUIRED for Peeling Products.

Product	Grade	Type of scalder	Alkali required for peeling 1,000 lb. of raw products: For peeling lb.	Dumped lb.	Total lb.
Peaches	Firm ripe	Draper, closed coils	3.2	0.7	3.9
	Soft ripe	Draper, closed coils	3.6	0.9	4.3
	Soft ripe	Spray	7.5	1.3	8.8
Sweet potatoes	Field run; freshly dug	Draper, closed coils	4.8	1.6	6.4
	Cured, small	Draper, open coils	17.5	9.5	27.8
	Cured, small	Draper, closed coils	14.6	5.2	19.8
	Cured, medium	Draper, closed coils	12.7	5.1	17.8
	Cured, large	Draper, closed coils	11.1	4.9	16.0
	Cured, jumbo	Draper, closed coils	9.3	4.9	14.2

TABLE VIII—EFFECT OF DETERGENT AGENTS on Laboratory Peeling of Elberta Peaches in Lye. Basis of Comparison, NaOH Solution Without Detergent Agent.

Detergent agent type	Detergent agent percent	Peeling time percent	Yield of product percent	NaOH used percent
Soda ash	1.00	12 less	1 more	5 more
Trisodium phosphate	1.00	10 less	2 more	35 less
Tetrasodium pyrophosphate	1.00	13 less	2 more	37 more
Sodium tetraphosphate	1.00	11 less	3 more	9 less
Alkyl aryl sulfonate (A.A.S.)	0.10	18 less	2 more	5 less
Alkyl naphthalene sulfonate (A.N.S.)	0.10	9 less	1 more	36 more
Sodium tetraphosphate	0.60			
A.A.S.	0.12	12 less	6 more	48 less
Sodium tetraphosphate	0.60			
A.N.S.	0.12	12 less	4 more	47 less
Light cleanser	1.00	16 less	8 more	1 more
Heavy cleanser	1.00	13 less	2 more	1 less

TABLE IX—EFFECT OF DETERGENT COMBINATIONS on Laboratory Peeling of Sweet Potatoes in Lye. Basis of Comparison, NaOH Solution Without Detergent Agents.

Detergent agent type	Detergent agent percent	Peeling time percent	Yield of product percent	NaOH used percent
Tetrasodium pyrophosphate	1.0			
Trisodium phosphate	0.2	10 less	1 more	7 more
A.A.S.	0.1			
Tetrasodium pyrophosphate	0.9			
A.A.S.	0.1	10 less	2 more	27 more
Sodium tetraphosphate	0.8			
Trisodium phosphate	0.3	15 less	3 more	20 less
A.A.S.	0.1			
Sodium tetraphosphate	1.0			
A.A.S.	0.1	15 less	4 more	22 less
Light cleanser	1.0	15 less	1 more	35 less
Heavy cleanser	1.0	17 less	1 more	22 less

TABLE X—EFFECT OF DETERGENT AGENTS on Commercial Peeling of Peaches and Sweet Potatoes in Caustic Soda Solution.

Detergent agent type	Detergent agent percent	Product grade	Run per hour lb.	Peel loss percent	Trim loss percent	Yield percent	NaOH used lb. per 1,000 lb. product
A. Peaches—closed-coil scalder							
None	—	soft ripe	12,493	30.4	17.9	51.7	3.73
None	—	firm ripe	13,085	25.6	20.3	54.1	3.43
Sodium tetraphosphate	0.60						
A.A.S.	0.06	soft ripe	12,613	32.3	17.0	50.7	4.14
Sodium tetraphosphate	0.60						
A.A.S.	0.06	firm ripe	14,986	23.4	20.7	55.9	3.67
B. Sweet Potatoes—open-coil scalder							
None	—	under 2 in.	5,073	52.9	12.7	34.4	27.0
None	—	under 2½ in.	5,712	52.1	10.8	37.1	27.6
Sodium tetraphosphate	0.60						
A.A.S.	0.06	under 2 in.	5,391	56.9	8.9	34.2	27.1
Trisodium phosphate	0.50	under 2 in.	5,661	57.2	6.8	36.0	25.6
Soda ash	0.90	under 2½ in.	6,168	50.2	9.3	40.5	17.3
C. Sweet Potatoes—closed-coil scalder							
Soda ash	1.50	under 3 in.	2,121	33 6	8.0	58.4	16.9
Sodium tetraphosphate	1.00						
A.A.S.	0.10	under 3 in.	2,225	29.7	6.0	64.3	17.3
Sodium tetraphosphate	1.00						
A.A.S.	0.10	under 3½ in.	2,250	29.0	4.8	66.2	15.5
Sodium tetraphosphate	1.00						
A.A.S.	0.10	over 3½ in.	2,335	24.0	2.7	73.3	12.6

212 deg. F., but large potatoes required 9 to 10 percent lye at this temperature. By adding salt to raise the boiling point of the solution, the large potatoes were peeled at 6 percent lye concentration with the temperature between 220 and 230 deg. F.

Correct Timing

Experiments show that proper timing of the contact of the lye solution with product being peeled, is as important as any other step in the peeling process. If the time of treatment is slightly too short, the peel will not wash off satisfactorily and extra trimming will be necessary; while if the treatment is too long the product becomes unduly soft and excess sloughing off occurs.

The optimum length of time for disintegrating the peel of a product depends upon the temperature and lye concentration; and after the optimum time is determined it should remain constant. The time of treatment is controlled by the speed of the scalder and should seldom be changed throughout the season, or for a particular variety.

Figures in Table IV show how increasing the length of time of scalding peaches resulted in marked increases in the peeling loss. Golden Jubilee peaches were peeled best after being scalded 1.2 min., and when the time was increased or decreased by as little as 1/10-min., the peeling loss was noticeably increased or decreased.

Elberta peaches were peeled best at 1 3/4 to 2 min., and when this time was increased by one min., the peeling loss was almost doubled; or when this time was slightly reduced the peaches were unpeeled.

Figures in Table V show how peeling losses of uncured and cured sweet potatoes were increased or decreased when the time of scalding was increased or decreased. Four min. was the optimum time for scalding uncured Porto Rico sweet potatoes and 6 1/4 min. was best for cured potatoes.

Properly constructed lye scalding vats allow for a drainage period between the time the product is removed from the solution or spray, and the time it enters the washer. This should be about one-fourth of the total time that the product is in contact with the lye. Thus, if 2 min. are required to disintegrate the peel, the product should be immersed or sprayed for 1½ min. and allowed to drain ½ minute.

Most of the lye which drains off the product can be returned to the main vat through an overflow tank under the drain. Bits of peel which slough off during draining are allowed to settle and hence do not return to contaminate the main solution. The drain effects: (1) A saving of the lye returned to the vat; (2) A saving of the lye which was used to remove the additional tissue; (3) An increase in yield, and (4) an easier washing job, with less possibility of lye being carried through the washer.

Results show that proper time of immersion and time of draining are as important as any other step in a lye peeling operation, if maximum efficiency and yield are to be obtained. See Table III.

The amount of alkali needed for peeling freshly dug sweet potatoes was found to be twice that needed for peeling cured sweet potatoes; and 4 times that required for peeling peaches. One-third more alkali was used when the heating units in the scalder consisted of open coils instead of closed coils; and twice as much was needed when the lye-spray scalder was used as when the draper-type scalder was used.

Alkali Required

Data in Table VII show that the alkali needed for peeling sweet potatoes may be used for actual removal of peel, wasted from the vat, or dumped after it has become too contaminated with dirt and fragments of sweet potato peel for use. These data also show that from 14.2 to 27.8 lb. of alkali were required to peel 1,000 lb. of sweet potatoes, depending upon the grade of potatoes and type of scalder. Only 65 percent of the alkali required was actually used for removal of potato peel.

Data on peach peeling show that from 3.5 to 9.2 lb. of alkali were required to peel 1,000 lb. of peaches, depending upon the maturity and the type of scalder used.

Loss of alkali by completely emptying the vat occasionally was necessary because the accumulation of dirt and organic matter in the bath, beyond a certain point, lowered the efficiency of peeling irrespective of the lye concentration.

The amount of alkali needed to peel white potatoes was similar to that for sweet potatoes, and about half as much was needed for peeling pears, carrots and beets.

The peeling of any fruit or vegetable product in lye is inhibited by the presence of wax, dirt, fuzz, or other material on the product which prevents thorough contact of the solution with the surface to be removed. Peeling is also retarded by the formation of interfering substances through chemical action of the alkali with the product, or with the minerals contained in the water used for making the solution. The use of certain wetting, or detergent, agents to overcome these difficulties has become quite widespread. These agents act by lowering surface tension and reversing the insoluble-salt-formation tendencies.

These compounds can be roughly divided into two groups: (1) Inorganic agents, the most widely used of which are the sodium phosphates and carbonates, and, (2) Organic surface-active agents, of which the alkyl aryl (A.A.S.) or alkyl naphthalene (A.N.S.) sulphonates are most valuable for alkali-peeling operations. The inorganic compounds are included in many commercial brands of alkali, and several well known cleansers contain both the organic and inorganic types.

Data in Table VIII, show the effects of the use of some of these compounds on peach peeling under laboratory conditions. Sodium carbonate (soda ash) decreased peeling time 12 percent, with not much difference in yield or amount of alkali used. The sodium phosphates also decreased peeling time about the same amount, but yields averaged 2 percent greater and, with the exception of tetrasodium pyrophosphate, considerably less alkali was required for peeling.

Organic Sulphonates

The organic sulphonates, in concentrations only one-tenth as great, gave about the same results for decrease in peeling time and increase in yield. The naphthalene sulphonate, however, used considerably more alkali than the other agents. Measurements of the amount of alkali removed from the peach surface by a standarized amount of washing, showed that increase in alkali consumption was due to more thorough penetration of the solution containing A.N.S. Conversely, the increased consumption of alkali with tetrasodium pyrophosphate was due to less efficient drainage of the solution from the peach surface.

Further study of Tables IX and X shows that combinations of inorganic with organic detergents gave results in keeping with the results obtained with the individual detergent agents. With peaches, peeling times were reduced 12 to 16 percent, yields were increased 2 to 8 percent, and alkali consumption was decreased 0 to 48 percent, each depend-

ing on the particular combination used. Sweet potatoes gave similar results, although yield increases and alkali decreases were of somewhat less magnitude because of the relatively greater difficulty in peeling sweet potatoes.

Data in Table X show the effects of using detergent agents for peeling on a commercial scale. Under these conditions the use of a combination containing organic sulphonate (A.A.S.) was not always an advantage from the standpoint of yield of product and reduction in alkali consumption. When using soft-ripe peaches, the increased penetration rate resulted in greater peeling losses and greater alkali consumption with correspondingly lower yields of product. With firm peaches this increased penetration was advantageous, since it resulted in more even peeling, and much more efficient washing, with increased yield. If the soft peaches had been graded more closely, the operation could have been improved by shortening the peeling time. But since many had hail-spots and rotten areas, decreasing peeling time would have slowed the operation, because of additional work for the trimming line.

Results from sweet potato peeling were of similar nature, although from a different cause. The very small potatoes, 2 to 2½ in., were peeled at 215 deg. F. and, due to the small diameter, much of the peeling action resulted from heat. The deeper penetration obtained from the use of the organic sulphonate combination resulted in increased peeling loss, although decreased trimming kept the yield about the same and therefore speeded up the total operation. The use of trisodium phosphate, without A.A.S., gave similar results, but soda ash was outstanding under these operating conditions in its economy of lye consumption and increase in yield of product. It apparently exerted a good detergent action without a tendency to increase penetration depth—in fact, laboratory studies indicated that soda ash may slightly decrease penetration depth.

Larger potatoes, although peeled at the same temperature, were not affected so much by heat, and results in Table X show that the A.A.S. gave much better results than soda ash. Here the peeling action was more nearly due to the lye, and increased penetration was of great advantage in removing waxy spots and cicatrixes due to diseases or rough handling.

Summary

1. A solution of from 5 to 10 percent alkali (lye) was satisfactory for disintegrating the peel of many fruits and vegetables for canning, freezing or dehydration. The process was found rapid, efficient and economical, and could be adjusted to very small as well as very large operations.

2. A formula for peeling each kind and variety of product, based on a balance between the lye concentration, temperature and time of treatment, needs to be adjusted to the particular type of equipment used in the plant.

3. Products with tender skins, as certain varieties of figs, should be peeled with one percent lye; those with moderately tender skins, as peaches, freshly dug sweet potatoes, new white potatoes, or carrots, should be peeled with 5 percent lye; while those with tough skins, as pears, cured sweet potatoes, old white potatoes, pumpkins, or winter squash, were peeled best with from 10 to 12 percent lye.

4. The lye bath should be kept boiling lightly at a temperature of from 212 to 220 deg, F., depending upon the concentration, for all products except peaches for freezing, in which case the temperatures should not exceed 150 deg. F. Vigorous boiling was undesirable since it produced excessive evaporation and caused greater changes in the lye concentration.

5. Sufficient time should be allowed for the lye to disintegrate the peel to the desired depth and to eat out rotten spots, bruises or insect bites. This required from one min. for products with tender skins to 10 min. for products with tough or thick skins.

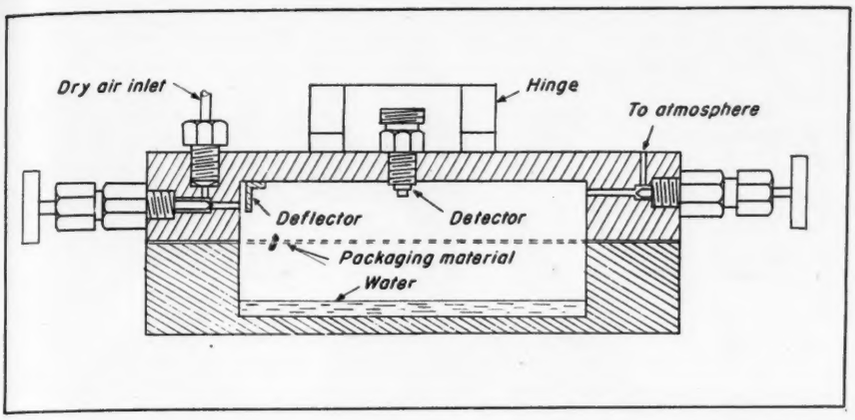
6. The equipment for lye peeling consisted of: (1) A vat of black iron in which lye could be maintained at the proper concentration and temperature, with provisions for treating the product for a definite length of time; (2) A washer, in which the lye and disintegrated peel were gently but thoroughly washed from the product, and (3) A bath containing 2 to 3 percent citric acid into which the washed product was dipped to neutralize traces of residual lye.

7. The amount of alkali required for peeling 1,000 lb. of fresh products varied from 3½ lb. for peaches with tender skins, to 30 lb. for cured sweet potatoes, with other products ranging between. Raising the lye concentration to 10 percent, and in turn increasing the temperature, reduced slightly the amount of alkali required for peeling. Only about 65 percent of the lye needed was actually used for disintegrating the peel of peaches or sweet potatoes, the remainder was wasted in various ways or dumped after it became unusable due to contamination with dirt and fragments of peel.

8. The losses due to peeling with lye were similar to those when other methods of peeling were used, and when the product was properly scalded, washed and acid rinsed, the quality after being canned or frozen was as high as that peeled by any other method.

References

1. Anon. USDA Bureau of Agricultural and Industrial Chemistry Printed Circular A.W.I. 100, 1944.
2. J. S. Caldwell, Farm and Home Drying of Fruits and Vegetables. USDA Farmers Bulletin 984, 1918.
3. J. S. Caldwell, Evaporation of Fruits. USDA Dept. Bulletin 1141, 1923.
4. C. W. Culpepper, J. S. Caldwell, M. C. Hutchins, B. D. Ezell and M. S. Wilcox, Dehydration of Pumpkins and Winter Squash. *Fruit Products Journal* 24, 170-77, 1944.
5. C. W. DuBois and D. L. Colvin, Loss of Added Vitamin C in the Storage of Frozen Peaches. *Fruit Products Journal,* 25, 101-3, 1945.
6. R. L. Dunlap, Lye Peeling Pays Off. *Food Industries,* 16, 969-71, 1944.
7. H. P. Gould, Fig Growing in the South Atlantic and Gulf States. USDA Farmers Bulletin 1031, 1919.
8. C. R. Havighorst, New Dehydration Plant Handles Record Quantities. *Food Industries,* 15(12), 81-85, 1943.
9. M. A. Joslyn and G. L. Marsh, Observations on Certain Changes Occurring During Freezing and Subsequent Thawing of Fruits and Vegetables. *Fruit Products Journal,* 12, 330-32, 1933.
10. J. G. Lankler and O. M. Morgan, How Wetting Agent Improves the Chemical Peeling Process. *Food Industries,* 16, 888-91, 1944.
11. C. L. Mazzola, New Caustic Peeling Method Reduces Waste, Saves Labor. *Food Industries,* 15, 53-54, 1943.
12. P. F. Nichols, R. Powers, C. R. Gross and W. A. Noel, Commercial Dehydration of Fruits and Vegetables. USDA Dept. Bulletin 1335, 1925.
13. I. T. Olsen, Wetting Agents Speed Chemical Peeling. *Food Industries,* 13 (4), 51-52, 1941.
14. S. C. Prescott and B. E. Proctor, "Food Technology," McGraw-Hill Book Company, Inc., New York. 406, 1937.
15. L. Stanley, Canning Fruits and Vegetables at Home. USDA Farmers Bulletin 1471, 1926.
16. E. S. Stateler, Now—Quick Dehydration. *Food Industries,* 17, 1450-52, 1945.
17. F. H. Thurber and P. W. Bohne, Rotary Machine Solves Peeler Problems. *Food Industries,* 17, 10-11, 1946.
18. A. L. Winton and K. B. Winton, "The Structure and Composition of Foods." John Wiley and Sons, Inc., New York. 72, 1932.
19. J. G. Woodroof, Peeling Peaches for Freezing. *Fruit Products Journal,* 9, 375-77, 1929.
20. J. G. Woodroof, Preserving Fruit by Freezing. I. Peaches. Georgia Experiment Station Bulletin 163, 1930.
21. J. G. Woodroof and I. S. Atkinson, Preserving Sweet Potatoes by Freezing. Georgia Experiment Station Bulletin 232, 1944.
22. J. G. Woodroof, E. Shelor, S. R. Cecil and I. Atkinson, Preparation of Peaches for Freezing. Georgia Experiment Station Bulletin 251, 1947.



PACKAGING MATERIALS can be tested quickly for water-vapor permeability with this apparatus. Detector indicates when relative humidity of air above packaging film reaches 25 percent. Time required to reach that humidity is a measure of the resistance of the membrane to passage of moisture.

Electrolytic Film Makes Moisture Determinations

Permeability of a packaging material to water vapor quickly measured. Device also will determine relative humidity, as well as moisture in liquids and solids.

QUICK determination of the permeability of packaging material to water vapor is possible with a new method developed by E. R. Weaver of the National Bureau of Standards.

Capable of measuring small amounts of water vapor in gases, the technic also has other applications. It will measure the relative humidity in small or comparatively inaccessible spaces under rapidly changing conditions. Determination of the capacity of drying agents or of the water content of organic liquids and solutions also is within its scope.

The new method is based upon a recently developed moisture detector. This consists of a thin film of liquid —usually phosphoric acid—in a gelatin or plastic binding material. Spread over the surface of a solid insulator between metallic electrodes, the electrolyte tends to reach equilibrium with the water vapor in the surrounding gas. It therefore forms a solution wherein the electrical conductance is a measure of the concentration of water vapor in the gas.

This phenomenon, then, can be utilized with the aid of a sensitive instrument for measuring or comparing electrical resistances and with a means of calibrating the film by comparison with a gas of known moisture content. Because of polarization, alternating current must be used.

Measuring Permeability

The quick response of the detector to low concentrations of water in small samples adapts it to the rapid determination of the water-vapor permeability of a protective film used in packaging. The film is clamped over an enclosed container of water a short distance above the liquid surface. Above the barrier is an enclosed space, at the top of which is the detector. This space is connected through valves to a supply of dry air and to the atmosphere. Before inserting the detector, its resistance is determined at a relative humidity of 25 percent. It then is placed in the space above the vapor barrier, and the space is swept out with a brisk stream of dried air for one minute. After the valves are closed, the time required for the relative humidity in the space to again reach 25 percent is an indication of the resistance of the membrane to the passage of moisture.

The permeability of a square inch of ordinary cellophane can be determined in less than a minute after closing the valves. An advantage of this method is the feasibility of testing very small samples of the packaging film.

Measuring Water Content

Since the water concentration of a liquid of otherwise constant composition bears a definite relation at any given temperature to the humidity of the air with which it is in equilibrium, the moisture concentration of a liquid may be determined by measuring that of the air above it. Covered by a glass tube with a small opening in the bottom, the detector is lowered into a bottle of the liquid to be tested. The tube then partially fills with the liquid and slightly compresses the air around the detector. By measuring the humidity of the air, the amount of water in the liquid is determined within two or three minutes.

It is expected that this device also may prove useful in determining the moisture content of fats and other substances which are soluble in organic liquids. The possibility of determining the water in solids also is suggested. Candy can be dissolved in alcohol, butter or other fat in ether or carbon tetrachloride, and the water in the solutions quickly determined.

Testing Desiccants

By passing air at a steady rate through a powdered solid and then through the measuring cell, the amount of water removed from the solid may be estimated. A similar procedure, in which saturated air is passed over a desiccant, has been found useful in determining the capacities of various drying agents under examination.

Determining Moisture in Gas

In determining the amount of moisture in a sample of gas, comparison is made with a gas of known moisture content. The pressures of the samples are adjusted until they have the same concentration of water, as shown by equal electrical resistance of the detecting film. The water concentration of the known sample is computed readily from moisture content and volume and is, of course, equal to the water concentration of the unknown sample.

MORE THAN 30 of these new units are in service or on order following their success in filling Kraft's two-day load carrying needs.

Kraft Designs Trailers For Bigger Loads

Straight trucks lacked capacity for overnight, two-day routes—so the company adapted a drop-frame semi-trailer that carries 18- to 20,000 lb. for the job

TO SECURE a more economical delivery cost on long routes in rural areas, where straight trucks with 12 to 14 ft. bodies do not have sufficient load capacity for overnight or two day routes, the Kraft Foods Co., Chicago, is making new use of a drop-frame semi-trailer. The vehicle has an 18-ft. body capable of carrying payloads of from 18,000 to 20,000 lb., depending upon legal axle weights.

First of the new trailers, designed to Kraft specifications, was put into service late in 1946. It has proved so successful that at the present time more than 30 such units are in service or on order.

Pulled by tractors, with engines of from 275 to 375 cu. in. piston displacement, and fitted with 72-gal. capacity gasoline tanks, the new tractor—trailer combination has a route range of over 400 mi. without a refilling of the fuel tanks.

The new tractor-trailer units have now been put into service in the various Kraft sales divisions, except those along the eastern seaboard and in the New England states. These new vehicles carry the full line of Kraft food products, including the company's line of cheeses, salad dressings, margarine, caramels and oven-ready biscuits.

Carry Advance-Sales Loads

All the new delivery units are operated on the advance-sales basis. Under this system, every item in each load has been ordered before the vehicle leaves the Kraft branch.

This advance-sales method of delivery is in direct contrast to the peddle system, in which the vehicle is loaded to capacity and sent out on the route to cruise until the driver-salesman disposes of the full load, or brings back that portion of the load that he has not sold. Such returns add to the cost of delivery through extra handling and clerical work.

The adapted vehicles range in capacities from 6,000 lb. (Kraft's smallest advanced-sale unit) up to the new 18- to 20,000 lb. drop-frame trailers. In fact, the larger types have proved so satisfactory that the branch routes are adding 22-ft. trailers of 24,000 lb. capacity. These super-size units are to be used in the company's northern division, which includes the States of North and South Dakota, where the routes are generally longer and the loads heavier.

The initial new drop-frame trailers were insulated but not refrigerated. Some of the later models now on order, however, are both insulated and refrigerated. The refrigeration is furnished by a mechanical direct-expansion system, with the cooling unit mounted on the outside nose of the trailer to conserve interior loading space. On the models with built-in refrigeration, the trailer body is divided into two compartments, with the most perishable items carried in the front compartment.

Refrigeration to provide an interior body temperature of 40 to 50

deg. F. has been found necessary in some areas to protect the loads against extreme heat and sweating. In other areas, extreme cold and freezing must be guarded against. Automatic gasoline heaters have been used in some nonrefrigerated trailer bodies to protect against freezing in below-zero weather.

Five Features

In summary, the engineering underlying the design and specifications of the new tractor-semi-trailer has included a combination of particular features. For besides development of a vehicle to carry a payload of 20,000 lb., there have been incorporated the following advantages: Protection of the load against extremes of heat and cold, provision for easy unloading by the driver-salesman on the route, maximum route range of better than 250 mi., and a road speed equal to legal limits, with sufficient reserve power to negotiate hills without too much slowing down.

There are many makes and models of two- and three-axle trucks that can carry a payload of 20.000 lb. at average road speeds. But these vehicles are expensive; have large powerplants and large diameter tires. They have a high body floor above the street, which results in slow and difficult store deliveries at sidewalk level. Hence, making use of the age-old fundamental that a horse, and also a motor vehicle, can pull more than it can carry, the decision to use a tractor-semi-trailer combination was made. But most trailers in standard production, principally for common-carrier long-haul operations, are 28 ft., 30 ft., or longer, in length and carry 30,000 lb. or more.

Special Doors

As a result, the Kraft company had to order a special, shorter trailer to carry 20,000 lb. and this proved to be 18 ft. in length. Next a drop-frame type was specified to give a body floor height of 37.5 in. above the ground to make unloading extremely easy on the route. Then, to expedite still further the unloading operations, the trailer body was provided with full width, double-hinged rear doors and a wide side door on the curb side.

As actually built, the initial trailers have an inside length of 17 ft. 6 in., with the front portion, over the fifth wheel, being 6 ft. long, and the rear dropped portion 11 ft. 6 in. long; an inside width of 7 ft. 5 in.; and a height of 5 ft. at the front, and 6 ft. 6 in. at the rear. These dimensions provide a net trailer-body capacity of 765 cu. ft.

LOW FRAME of trailer provides easy access to load along the route, from either side or rear. These double rear doors can be opened flat against the body.

How They're Insulated

To protect the loads in transit, the trailer body is insulated with Fiberglas—from 2 to 3 in. in the sides and ends and 3 to 4 in. in the roof (amount of this insulation depending on the climate in the territory to which the vehicle is to be assigned). Moreover, there is 1½ in. of cork and oak in the floor.

On some of the later models now on order, the body will be divided into two separate compartments by a transverse insulated partition and the front compartment used to carry the most perishable parts of the load. The front compartment will be refrigerated by a mechanical direct-expansion system as previously explained.

To pull this trailer, the tractors with engines of from 275 to 375 cu. in. piston displacement were specifically selected to give adequate road speeds under full loads, even in hilly route territory. Both the tractors and trailers are equipped with air brakes all around to give maximum road safety.

To provide the tractor-trailer combinations with sufficient route range, the tractors are equipped with two 36-gal. saddle-mounted safety gasoline tanks to give a total fuel capacity of 72 gal. At a fuel consumption rate of 6 mi. per gallon, this would give a top range of 72 x 6, or 432 mi., without refilling.

Safety Factors

If the tractors supplied have under-the-seat gasoline tanks, these are disconnected to eliminate the fire hazard should the unit be overturned in an accident. The tractor and trailer are further equipped with directional turning signals, reflectors and marker lights, in accordance with the safety requirements of the Motor Carrier Bureau of the Interstate Commerce Commission.

Another detail of construction is a safety deck on the tractor frame in back of the cab.

For easy disconnection of the tractor and trailer for major repairs to either unit, the trailer is equipped with a hand-operated vertical landing gear. The tractor and trailer are fitted with 9.00-20 or 10.00-20 tires all around, with one spare carried inside the trailer.

Survival of "Salmonella" Organisms in Stored Egg Powder*

At temperatures necessary to maintain dried egg quality, Salmonella remain viable for long periods. The survival period decreases, as does solubility and quality of the egg, with increase in time and temperature of storage

By MARION E. WILSON,** Microbiology Research Division,
Bureau of Agricultural & Industrial Chemistry, Agricultural Research Administration,
U. S. Department of Agriculture, Washington, D. C.

THE PRESENCE of Salmonella organisms in whole egg powder bears a significant relationship to their viability in the powder under variable storage conditions. Information concerning this relationship has only begun to accumulate in recent years.

Shortly after Lend-Lease shipments of spray-dried whole-egg powder began to arrive in England, the U. S. Department of Agriculture was advised by the British Ministry of Food that some lots were contaminated with Salmonella organisms. This was the first information received that these organisms survived the dehydration process in appreciable numbers, and remained viable throughout storage and shipping periods. Consequently, experiments were set up to determine the effects of storage time and temperature on survival of these organisms.

Survival of *S. Montevideo*

Triplicate samples of high-moisture spray-dried whole-egg powder, with an original bacterial count (tryptone-glucose-extract agar, 86 deg. F.) of approximately 5,000 organisms per gram (mixed flora) were examined for Salmonella and found to be negative. Thirty to 35 lb. were then contaminated by spraying with a suitably diluted 24-hr. tryptose broth culture of *S. montevideo*. The resulting concentration of organisms, including the initial mixed flora, approximated 24,000 per g.

The contaminated powder was dispensed in sterile friction-lid cans, 190 g. per can. Several cans were stored at each of the following temperatures: −11.2, 35.6, 68, 86, 98.6, and 113 deg. F. At designated time intervals, examinations were made to determine qualitatively the presence of Salmonella and to observe the effects of storage time and temperature on the plate counts. At each interval, typical and atypical Salmonella colonies appearing on the selective plate media were confirmed by slide agglutination with the appropriate "O" group antiserum (C/1 in this case).

Results of Experiment

As the storage time lengthened, suspicious colonies were completely confirmed by biochemical and serological methods. Samples were recorded as negative only after failure to obtain an agglutination reaction with any of the colonies picked from all bismuth sulphite (Difco), SS (Difco), desoxycholate-citrate (B-B-L) and tryptone-glucose-extract agar plates. From time to time, determinations of pH, moisture and solubility were made. The experiment was terminated at the 37th week.

Slide agglutination and plate count findings are presented in Table I. The former show that at temperatures up to and including 68 deg. F. Salmonella organisms were recovered in all the samples examined through 37 weeks. At 86 deg., samples yielded Salmonella consistently through 12 weeks. Those examined at 28 and 37 weeks were negative, although they contained other viable micro-organisms. At 98.6 and 113 deg., Salmonella organisms were recovered through six weeks of storage and not therafter. They were not recovered from a 10-day 113 deg. sample.

More rapid and sharper decreases in plate counts occurred in samples stored at the higher temperatures. Occasional irregularities noted in the downward trend may have been due to incomplete mixing of the Salmonella sprayed powder.

In Table II are recorded some pH values for samples of powder stored at the 6 test temperatures. All measurements were made on the reconstituted powder with a pH meter employing glass and calomel electrodes.

Moisture determinations made after storage for 12 weeks did not reveal any significant variation from the original reading of 4.6 percent. Solubilities of the powders stored at the higher temperatures had dropped, however, from 1 to 0.5 (Stuart solubility index). Moreover, the powder showed different degrees of darkening, which increased in intensity with the temperature and time of storage. No moisture or solubility readings were made after 12 weeks.

Survival of *S. Oranienburg*

This experiment was set up in the same manner as the preceding one, except that 50 lb. of Salmonella-negative powder with a bacterial count of 13,000 organisms per g. (mixed flora) were seeded with *S. oranienburg* to give a final concentration of approximately 400,000 organisms per g. The experiment was terminated at the 41st week.

Findings with respect to the survival of *S. oranienburg* parallel for the most part those obtained with

*This investigation was undertaken in cooperation with Poultry Branch, Production & Marketing Adminstration, USDA, Washington, D.C.

**Present address: Massachusetts General Hospital, Boston, Mass.

TABLE I—SURVIVAL OF *S. MONTEVIDEO* in Artificially Contaminated Egg Powder Stored at Various Temperatures.

Storage period days	— 11.2 deg. F. Salmonella agglutination reaction[a]	— 11.2 deg. F. Plate count[b] per g.	35.6 deg. F. Salmonella agglutination reaction	35.6 deg. F. Plate count per g.	68 deg. F. Salmonella agglutination reaction	68 deg. F. Plate count per g.	86 deg. F. Salmonella agglutination reaction	86 deg. F. Plate count per g.	98.6 deg. F. Salmonella agglutination reaction	98.6 deg. F. Plate count per g.	113 deg. F. Salmonella agglutination reaction	113 deg. F. Plate count per g.
0		24,000		24,000		24,000		24,000		24,000		24,000
1						8,200		6,340		6,000		2,940
3	+		+		+	5,600	+	4,600	+	2,600	+	5,250
7	+	13,500	+	11,100	+	5,530	+		+	1,700	+	1,130
10					+	5,100	+	2,900	+	1,800	—	800
Weeks												
2	+	25,400	+	8,960	+	8,300	+	3,230	+	1,400	+	730
3	+	17,500	+	8,230	+	43,720	+	2,600	+	2,300	+	700
4	+	12,000	+	10,800	+	3,600	+	2,400	+	1,600	+	600
5	+	13,800	+	8,600	+	3,200	+	1,700	+	950	+	200
6	+	14,300	+	6,700	+	2,800	+	2,100	+d	620d	+d	330d
8	+	17,700	+	7,100	+	2,330	+	1,430	—	440d	—	220d
10	+	16,630	+	5,170	+	2,300	+ c	1,530	—	620d	—	90d
12	+	16,860	+	5,300	+	1,800	+	1,330	—	330d	—	150d
28	+ c	12,100	+ c	4,200	+ c	1,150	—	950	—	170d	—	<100d
37	+ c, d	10,360d	+ c, d	3,920d	+ c, d	1,220d	—	300d	—	90d	—	120d

a Typical and atypical Salmonella colonies were picked from one or all bismuth sulphite, SS, desoxycholate citrate and tryptone-glucose-extract agar plates and tested with C_1 group antiserum.
b Tryptone-glucose-extract agar (APHA formula) plates were incubated for 3 days at 86 deg. F.
c Isolates were identified as *S. montevideo* by biochemical and serological methods.
d Based on examination of 2-3 11-g. portions of egg powder from as many containers.

S. montevideo. Organisms were recovered from all samples stored at 68 deg. F. or below through 41 weeks. They were recovered from samples held at 86 deg. through the 12th week and again on the 41st week, but were not recovered from samples examined the 32nd week. They were recovered from samples stored at 98.6 deg. up to and including the 12th week but not thereafter. Recovery of organisms from samples stored at 113 deg. was sporadic. Although they were isolated from a 14-week sample, they were not recovered regularly from all samples examined at shorter periods.

Plate count, pH and color changes occurring at the six temperatures were of the same order observed with *S. montevideo*. Solubility indices at the 12-week period ranged from 1.2 at −11.2 deg. to 0.4 at 113 deg. F. The solubility index of the original material was 1.2.

Natural Contamination

Two-hundred-eighty-three samples of Salmonella-contaminated, high-moisture, spray-dried whole-egg powders were selected at random from those examined during the incidence study.[1] They represented USDA lots produced in 60 dehydration plants. All were stored in their original containers—tin, glass, fiberboard or triplex lamofilm-lined kraft paper bags. One hundred eleven were placed in storage at 35.6 deg. F. and 172 at 80.6 deg. immediately after their first examination. Included with each group were samples of powders which upon original examination had been negative for Salmonella.

All samples were re-examined one to three times over a period extending from 2 to 65 weeks from the date of their initial examination. The presence of Salmonella in samples stored at 35.6 deg. F. and re-examined for the first time was confirmed only by slide agglutination of the suspected isolates with appropriate "O" group antisera. In all other re-examinations confirmation was made by complete biochemical and serological identification. One colony, and in many instances 2 or 3 colonies, were identified from all postive samples at each examination.

The numbers of Salmonella-positive and Salmonella-negative samples obtained on re-examination are shown in Table III. At 35.6 deg. F. there was a decrease in the number of Salmonella-positives obtained with each storage interval. This decrease could not be attributed to the decreasing number of samples re-examined at successive periods, since most samples which were positive upon first and second re-examinations were analyzed a third time. Seven Salmonella types were isolated from the 58- to 65-week old positive samples at each examination. *tevideo, S. oranienburg, S. anatum, S. senftenberg, S. tennessee, S. madelia* and *S. typhimurium*. Four control samples, initially classed as negative because Salmonella were not isolated at the time of the first examination, were re-examined at each of the storage time intervals. Three remained negative; *S. pullorum* was isolated from the fourth sample the 24th week of storage. Re-examination of this sample after a longer storage period failed to show the presence of *S. pullorum* or any other Salmonella type.

Twenty of 172 Salmonella-positive samples re-examined after 12 to 34 weeks of storage at 80.6 deg. F. were still positive. Of these, 12 had been in storage for 24 to 34 weeks. The Salmonella types surviving in the 12 samples were: *S. montevideo, S. oranienburg, S. anatum, S. senftenberg, S. newington, S. london, S. bareilly*, and *S. cerro*. One of the two negative control samples remained negative on re-examination. *S. georgia* was isolated from the other after storage for 14 weeks. None of the 172 samples was re-examined more than once.

Variability was noted in the isolation of Salmonella types from re-

(*Continued on page* 210)

TABLE II—CHANGES IN pH in Egg Powder Artificially Contaminated with *S. Montevideo* and Stored at Various Temperatures.

Storage period weeks	pH at Various Temperatures (Deg. F.) —11.2	35.6	68	86	98.6	113
0	8.1	8.1	8.1	8.1	8.1	8.1
1	8.0	8.0	8.0	8.0	7.8	7.3
6	8.0	8.0	8.0	7.8	7.6	6.5
12	8.0	8.0	7.7	7.3	6.6	6.3
37	8.2	8.2	7.4	6.8	6.4	6.1

TABLE III—SURVIVAL OF SALMONELLA in Naturally Contaminated Egg Powder

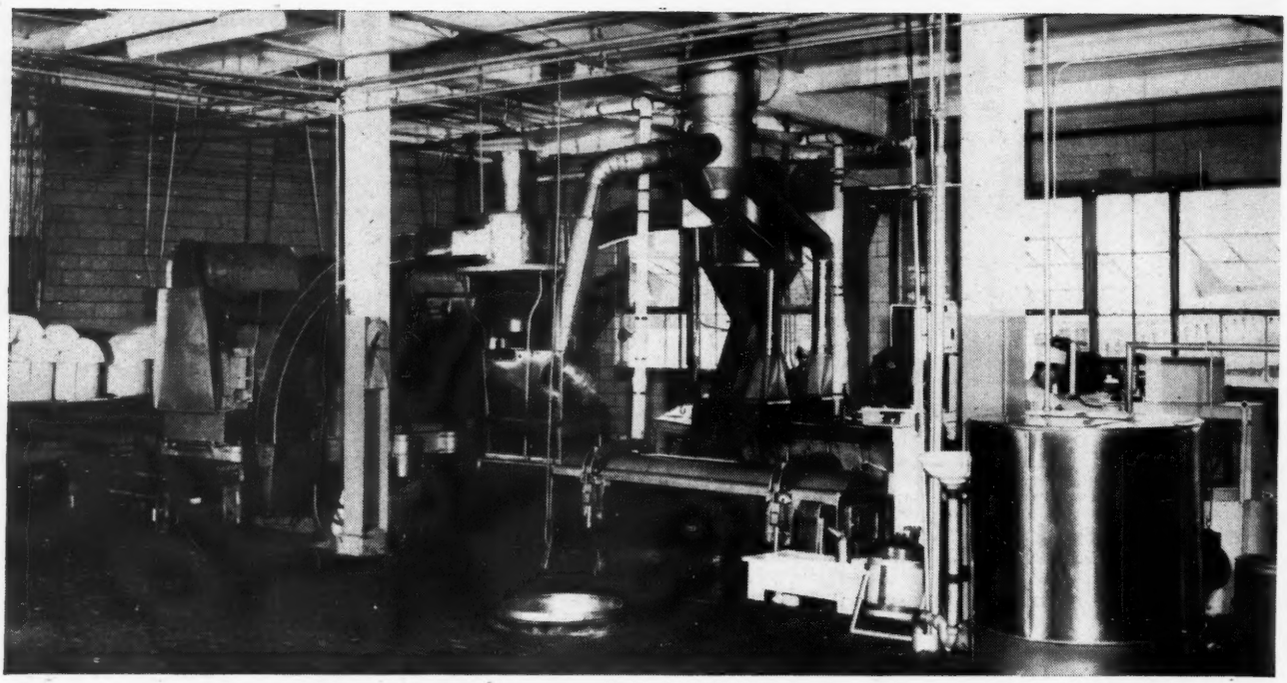
Stored at 35.6 deg. F.

Initial exam. (No. samples)	First re-exam. 2-21 wks.	Second re-exam. 23-56 wks.	Third re-exam. 58-65 wks.
111 +	49 +	25 +	9 +, 15 —, 1*
		18 —	3 +, 7 —, 8*
			6*
	62 —	10 +	1 +, 5 —, 4*
		52 —	10 —, 42*

Stored at 80.6 deg. F.

Initial exam. (No. samples)	Re-Exam. 12-34 wks.
172 +	20 +
	152 —

+ Salmonella positive
— Salmonella negative
* Number of samples inadequate for re-examination.



ESSENTIAL STEPS in cheese production line are: Grinding quartered cheese to shreds, blowing cheese by air conveyor to one of two melter-mixers, melting and mixing cheese thoroughly in melter-mixers to a homogeneous mass of uniform color, texture and taste.

Cheese Processing Put On Batch-Continuous Basis

Continuous production of processed cheese is achieved by alternate use of two melter-mixers to which cheese, in batches, is blown from the grinder

By F. W. McCARTHY, Assistant Editor, "Food Industries"

IMPROVED equipment and methods have developed an unusual production line for process cheese in the Dixon, Illinois, plant of The Borden Co. The production line begins with a batch process and finishes on a continuous basis. This is accomplished by the use alternately of two melter-mixers to which the cheese is blown from the grinder by an air conveyor. The capacity of the continuous process is 10,000 lb. of processed cheese per hour.

Cheese Classifications

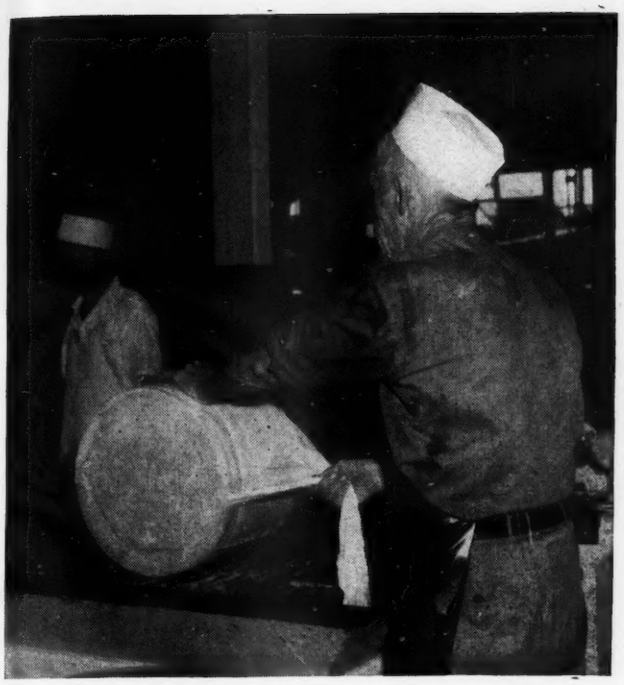
American Cheddar cheese is usually pressed into hoops lined with cheese cloth before aging. When the hoops are removed and the cheese has been held the proper number of days, the cheese cloth covering is coated with paraffin to protect the cheese and keep it from drying. Cheese is classified as: Current—not over 30 days old; short held—1 to 6 months old; aged—over 6 months old.

Cheese arrives at the processing plant in trucks and railroad cars from the company's factories and from individual producers. Industrial power trucks are used in the unloading operations to carry the cheeses to a gravity chute leading to the grading room in the basement. All cheese is tested, graded and weighed after arrival at the plant. It is tested for butter-fat content, moisture content and extraneous material. It is graded by a qualified expert, according to U. S. Standards for taste, color, odor and texture.

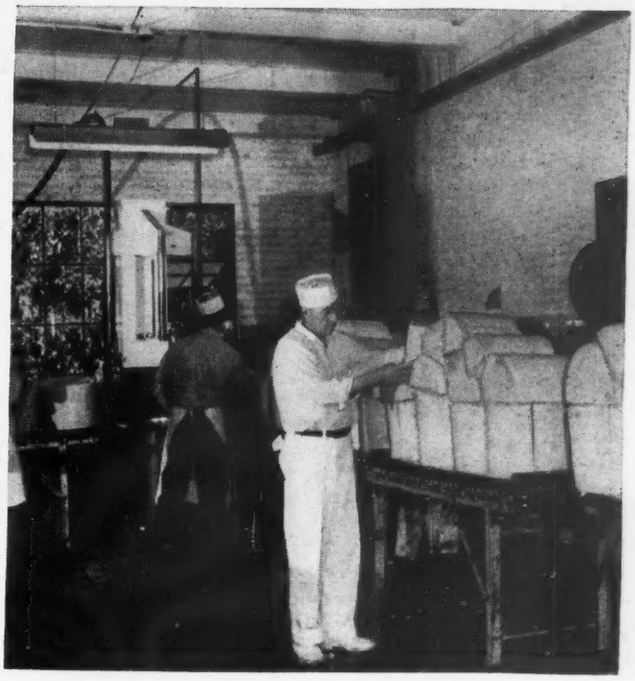
After weighing and grading, the cheese is dipped in paraffin and transported by truck to insulated storage rooms in the basement. Temperatures in these rooms range from 34 to 45 deg. F. These variable temperatures are a part of aging. Unit coolers are employed as refrigerating equipment in the various storage rooms.

Cheeses from storage, according to age, moisture content, fat content, flavor, body characteristics and color are selected to form a batch. In this manner, quality control of the finished product is definite. Since the variables are known, the blend can be established to obtain the desired uniform end product. A batch is composed of seven cheeses of cheddar size and weighs about 500 lb.

Batches are delivered from storage to the processing room on the third floor by elevator. In the proc-



1. PARAFFINED cloth is stripped from cheeses. During storage the cloth protects the cheese from mold and drying.



2. WHOLE cheeses are quartered by a mechanical pie slicer (left). One steel-surfaced tray holds 28 quarters of cheese.

essing room, the cheeses are first stripped of cloth and paraffin. The stripped cheeses are transferred to an adjoining roller conveyor which delivers them to a mechanical pie slicer. Operating at 100 psi. air pressure supplied by a 10 hp. motor-driven compresser, the slicer cuts each cheese into quarters. Compressed air, used also for cleaning purposes, is available from hose taps located on the slicer.

The quartered cheeses are placed on stainless steel-surfaced wooden trays. Each tray holds a full batch of 28 quarters and is moved to the grinder on a roller conveyor. A Damrow grinder, fed by an operator and driven by a 100 hp. motor, with a capacity of 10,000 lb. per hour grinds the cheese into flake-like shreds. The

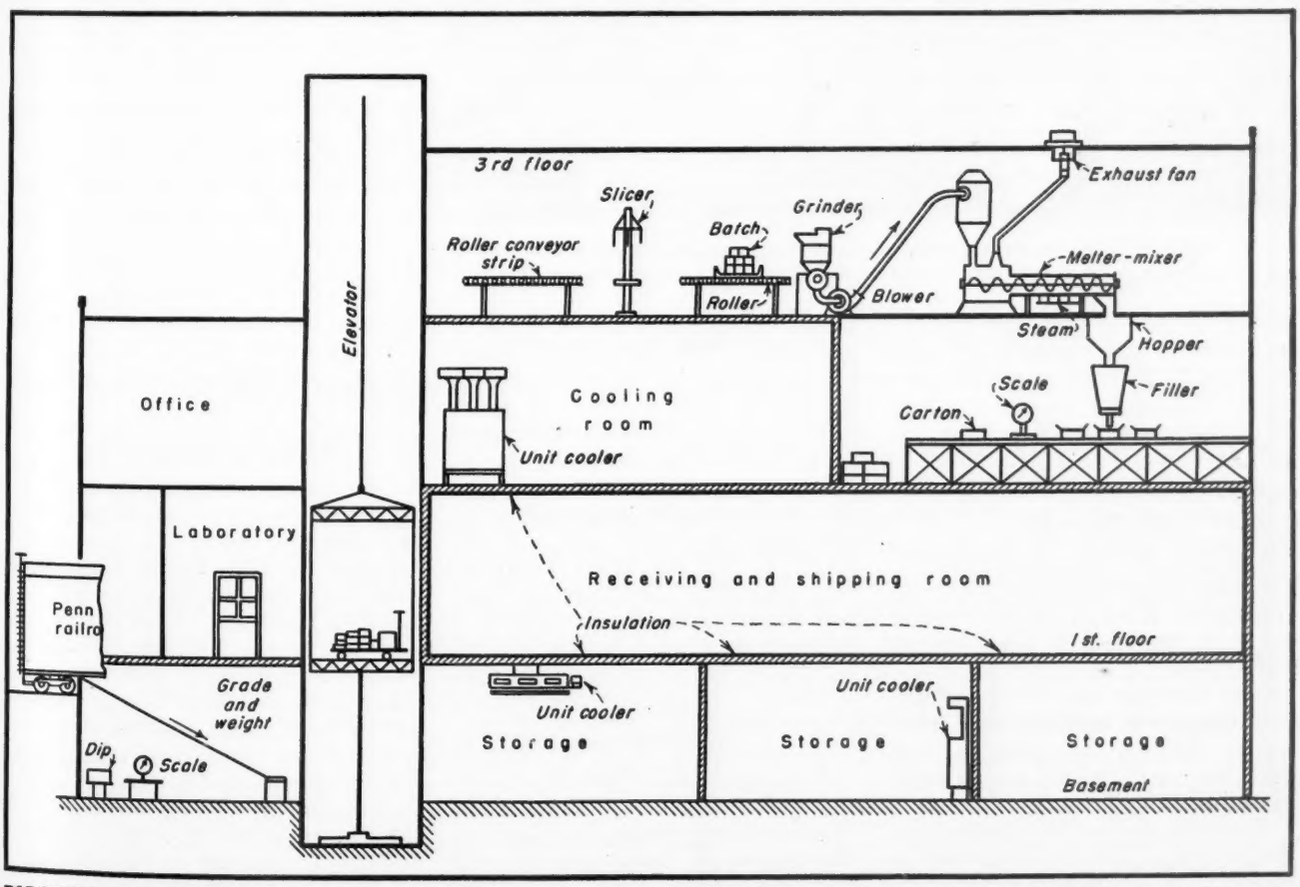
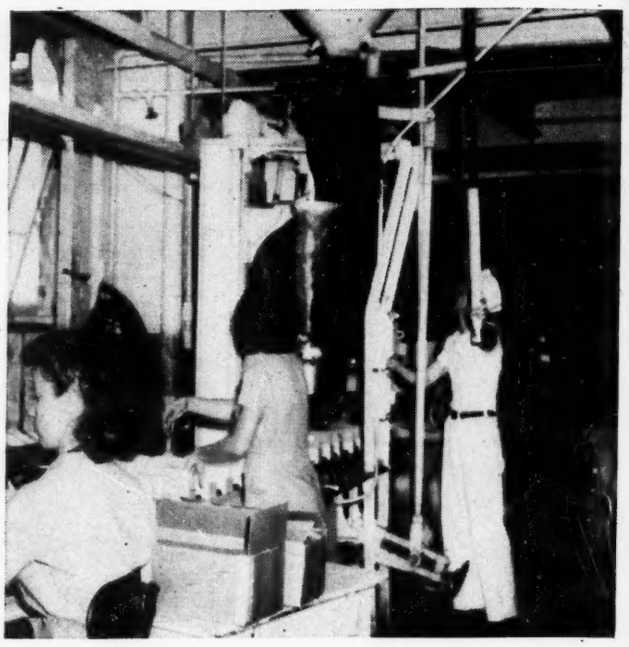
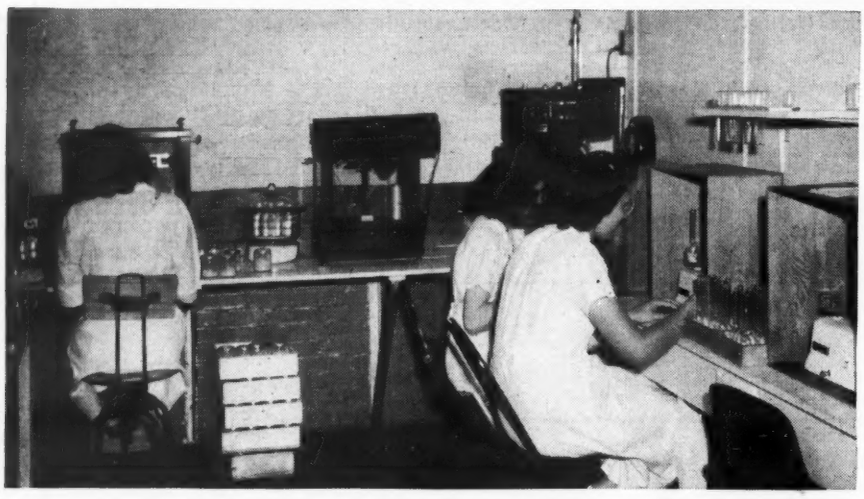


DIAGRAM of plant layout shows grading and weighing room, elevator to third floor, where cheese is stripped, sliced, ground, blown to melter-mixers and heated. Hoppers on second floor feed extruder which fills packages. Cheese is cooled prior to shipping.

3. QUARTERED cheeses are fed to the grinder by hand. Shreds are blown to the melter-mixers at rate of 10,000 lb. per hr.



4. PACKAGING line is located under melter-mixers. Melted cheese falls into hopper of the extruder, shown here.



LABORATORY tests are made on finished cheese, and also controls unprocessed cheese prior to batching. Cheese is tested for moisture content and butter-fat.

blades of the grinder are straight bars which rotate around a central shaft at 1,750 rpm. and force the cheese through holes in a screen surrounding the lower half of the grinder. The ground cheese drops into an air conveyor.

Air Conveyor

The air conveyor is composed of a blower, duct lines, cyclone and exhauster. It delivers the cheese flakes in the desired form to the melter mixer. Delivery of the cheese to the melter-mixer in this fluffy form results in uniform heat treatment. The air-conveying hopper, duct lines, and cyclone are all made of stainless steel.

From the cyclone, the cheese drops directly into the melter-mixer or cooker. The stainless steel cooker is approximately 15 ft. long, egg shaped in section, 18 in. x 24 in. It is a jacketed trough in which rotates a 10-in. screw, having a 4-in. hollow shaft with 3-in. flights. The screw is driven by a 5 hp. variable speed motor. The action of the flights forces the cheese from the filling to the discharge end. Steam inlets are arranged along the sides of the cooker so that live steam is directed into the mixer. The latter, a Damrow machine, is constructed with a hinged top or hood permitting complete access to the trough and to the screw for cleaning purposes.

Melter-Mixers

The cheese flakes are blown into the melter-mixers in fluffy, flake-like non-lumpy shreds. The action of live steam in direct contact with the flakey shreds results in uniform and thorough melting to form a homogeneous smooth mass. Cheese is in the melter-mixer for approximately five minutes. For part of this time the filling operation still continues. Until the mixer is completely filled, the cheese is forced toward the discharge end of the mixer by the 10-in. screw. When the inlet valve is closed, the cheese flows back across the top of the screw to the filling end. This cycle continues until the cheese is thoroughly mixed. The complete operation of filling, heating to the final temperature and withdrawing takes six minutes. Since all the cheese flakes have direct contact with the steam, the whole mass is of uniform consistency.

Two melter-mixers are used alternately, one filling while the second is mixing. The grinder takes three minutes to grind sufficient cheese to fill one melter-mixer, so the two mixers are staggered three minutes in their six-minute cycles.

Automatic Packaging

The melted processed cheese flows by gravity into a stainless steel hopper directly above the packaging lines on the floor below. From this hopper, a volumetric extruder deposits a fixed amount of cheese into the coated cellophane pouch, which has previously been placed in the tray of the fibre package. Automatic packaging machinery takes command at this point. After being packaged, the finished product is delivered to the cooling room where the cheese is cooled until it is firm enough for storage or for shipping. Industrial hand trucks are employed to convey cheese to storage.

EDITORIALS

COMMENT AND OPINIONS

Needed—Civilian Food Plan

THE general attitude of this country is reminiscent of the days of F.D.R.'s "Quarantine" speech some years ago. Outside of a few who, like Henry Wallace and his supporters, have intellectual processes that are hard to follow, the huge majority is fed up with the eternal turmoil and clamor that stem from Russia. Plainly Russia must be stopped, but the only educational force capable of impressing the Slavic mind is a superior force. Anyone who has read Dr. Goebbel's diary has gained an acute appraisal of the directing genius of the Politburo from an independent source.

It is not for this publication to weigh the merits of our foreign policy, but to point out the impact on the food processing industry of the foreign policy changes as they unfold. We could be heading for a shooting war in the not too remote future, and up to now there has not been any evidence of a strategic plan of defense of the U.S.A. as far as food supply is concerned.

Brief pieces in the daily press have hinted that the eight corps areas of the United States are to be set up as independently functioning units in case of attack or invasion. Which is all to the good from the viewpoint of military strategy, but from the viewpoint of food supply, especially for the civilian population that is always 10 times bigger than the armed forces, it is no plan at all. The strategy of defense must be more comprehensive than that. It overlooks the simple fact that some of the corps areas have never been able to feed themselves, are so dependent on raw materials or packaging supplies or fuels from other corps areas that a wholly new concept of defense strategy must be developed.

Reserve Officer Assignments

WARTIME assignments for technical personnel are under study in Washington. This is not merely a theoretical thing. It is a very real program, much of which may be put into effect before very long, even without war.

Most significant for food technologists is the problem of reserve officer assignments. Many such men may be needed, at least temporarily for so-called "training." Some will be kept as long as they can be held to assist in procurement programs of a technical sort. All this means a possible raid on limited professional personnel in food manufacturing companies.

Smart managements will inquire of their technical staffs as to which individuals are reserve officers. They will assist these men in determining their status and the possibility of being called for temporary or longer duty. Naturally, replacement problems will have to be studied wherever a call for preparedness service seems at all likely.

Of the greatest long-term importance will be the effort of individuals and their employers to have skilled personnel properly used when needed for military service. It is not sensible to have skilled food scientists and plant engineers put on jobs which do not utilize their professional talents. It is not too soon to have each individual case studied by both the individual and his employer. Washington is much too serious, in its planning to be ignored.

Too Late—for World War III

ONE would have thought all the griping about the omission of the profession of Food Technology from the National Roster of Scientific and Specialized Personnel in World War II would have served notice to the powers-that-be that the profession deserved greater recognition.

Yet those who have received the current five-foot questionnaire from American Men of Science —which presumably serves as the World War III equivalent of the aforementioned abortion—will be disappointed at the minor status again accorded to Food Technology. It seems as if some of the barons of chemistry in the non-food fields had decided, after a brief consultation with a biochemist, that Food Technology should be bracketed with nutrition.

Although the profession is on the list this time, it is disheartening to realize how vague is the concept of the field in the minds who drew up the questionnaire.

When, as and if the emergency arises and the real food technologists with industrial experience are too few to serve the needs of the nation—or if all the youngsters in the profession are doing military police duty, KP or other non-technical jobs—it will be too late to do anything about it. The damage was done about the end of 1947 when the questionnaire was drawn up.

Enter the Pressure Cooker

MILLIONS of pressure cookers are being sold to progressive housewives. Many buy them simply to be able to get dinner quickly when they come home late from a bridge party. But many are discovering very substantial advantages in palatability of products which are pressure cooked.

Lately one observation was made in the home of a man who has a keen knowledge of food trends. He observed that the can opener had been used relatively little since the pressure cooker came into the kitchen. He asked about this. His wife promptly confided that she now could get raw vegetables ready so quickly with this new aid that can-opener cooking no longer was necessary to save time.

The pressure cooker seems to be a logical com-

panion to prepared packaged vegetables, washed and ready to cook when they come home in the market basket. Perhaps these two factors together may reduce the city housewife's use of processed vegetables. Anyway, it is a trend that deserves watching and study.

Doubly Worth Saving

HEAT units cost much more than ever before. Some cost twice as much as ten years ago. Plant managers, superintendents, and foremen should review every point of fuel and energy use. They ought to recalculate losses and reestimate the cost of further economy. The result may be the discovery of needless and costly waste and the realization that the cost of measures to eliminate the waste may be justified now, even though it was not a few years ago.

If you make no such discoveries, you deserve congratulations for operating a much-better-than average plant.

The Chesterman Award

OUTSTANDING technical contribution to the progress of the carbonated beverage industries is annually recognized by the Chesterman Award. This is a diploma and a cash award of $1,000 given to the individual believed by the committee of American Bottlers of Carbonated Beverages to have made the most outstanding contribution during the calendar year.

This effort of A.B.C.B. deserves compliment for two reasons. One is the fact that the award is made at all; the other that the award goes to any person thought worthy of it, regardless of connection or position. Nominees need have no connection with any member company. In fact, nominations for the award do not necessarily come from such company, but may be made by outsiders as well.

There is need for more such activity in organized food industries. Not enough importance is placed on new basic science and on new technology. It takes just the stimulus of this type of recognition to set more folks thinking about the importance of both the science and its application. Such thinking by many folks, most of them not prospectively award candidates, is certain to bring much more rapid advancement to an industry than will come without that urge.

Business as Usual

UNLESS canned foods should be included in the European Recovery Program—and this is no more than a hope—canners this year may not find an eager market for their total pack. In fact, many canners feel that 1948 will be a highly critical year.

Wise packers, then, will be prepared. They will make certain that they are in a position to properly store and finance part of their pack. Otherwise they may be forced to sell at unprofitable prices to pay for operating expenses, not only harming themselves but weakening the market.

Forward-looking packers also will watch the quality of their products closely. Economic barometers indicate continued high level of buying power through 1948, so good foods are more likely to find a ready market than those of mediocre or poor quality. Certainly uniform quality is a must.

More attention also should be given to merchandising and to attractive and informative labeling. Other things being equal, the most business goes to the most effective merchandiser. So a critical look at the entire distribution setup is in order.

One-Floor Efficiency

SINGLE-story buildings for manufacturing purposes came in for a big boost at the recent Materials Handling Exposition. This type of building is best adapted to the use of floor type conveyors (set flush with the floor). Some of the most efficient firms in all industry are now going in heavily for this sort of materials handling.

Materials handling is the most vulnerable of all cost items of production for anyone who is interested in cost reduction. Something of the order of 15 percent of total cost is accounted for by the expense of moving stuff about. It will be found, however, that the real economies can be made only by a comprehensive, broadly conceived plan. Such a plan must include a building adapted to economical operation if the ultimate is to be attained. And generally this is the single-story plant.

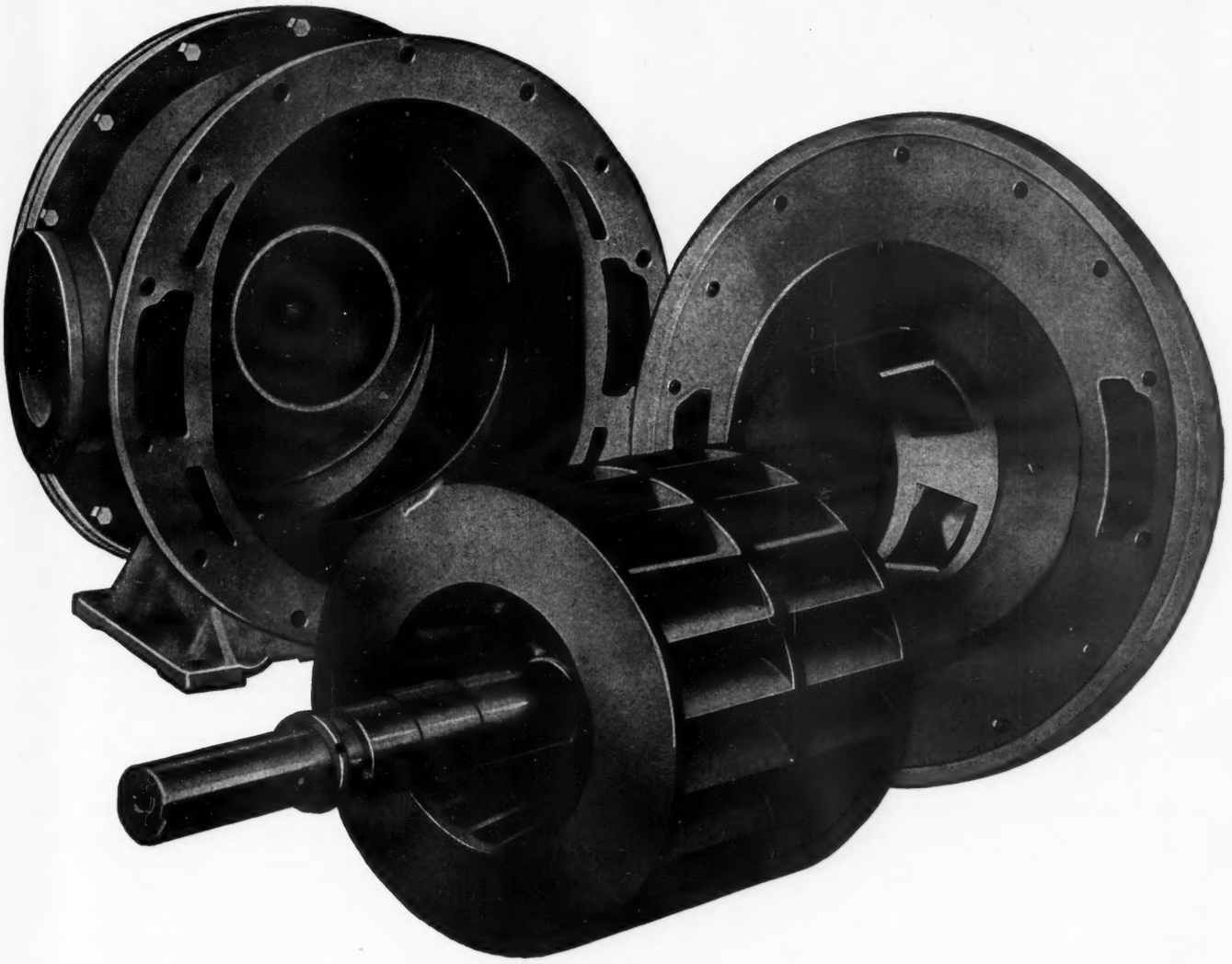
Where pet ideas can be set aside and the problems studied impersonally from the viewpoint of the lowest ultimate cost per unit of goods manufactured, it is usually found that it is far cheaper to spread out in high-cost land areas than to go up in the air for manufacturing purposes. The freight elevator has not yet been made that can compete in efficiency with conveyors and fork lift trucks on straight-away travel.

Impact of Synthetics

WITH Monsanto manufacturing synthetic caffeine, and Dow in the production of six synthetic amino acids selling at various prices up to about $85 a pound; with Nopco, U. S. I. C., American Cyanamide, Winthrop and other chemical companies also producing synthetics of the foregoing type, there is a new competitive factor to be reckoned in projects for research. There would be no point in trying to develop similar products from food raw materials if the organic chemist can do it better or more cheaply.

As a wise Chinese once remarked about the competition of synthetic fibers with silk: "When a worm is in competition with a machine, the worm is at a slight disadvantage."

Only *Nash Vacuum Pumps* have all of these advantages



Nash Vacuum Pumps are simple, having but one moving part. These pumps have unusual characteristics. They will handle a gas and a liquid simultaneously. Slugs of liquid entering a Nash Vacuum Pump do no harm. Thousands are rendering service where this condition is present.

A unique feature of Nash Vacuum Pumps is that, in handling hot and saturated vapors, they have a condensing effect . . . The operating principle involves an internal liquid seal, which condenses and contracts hot vapors and gases . . . Unless the amount of hot vapor is great, other condensing devices are not necessary.

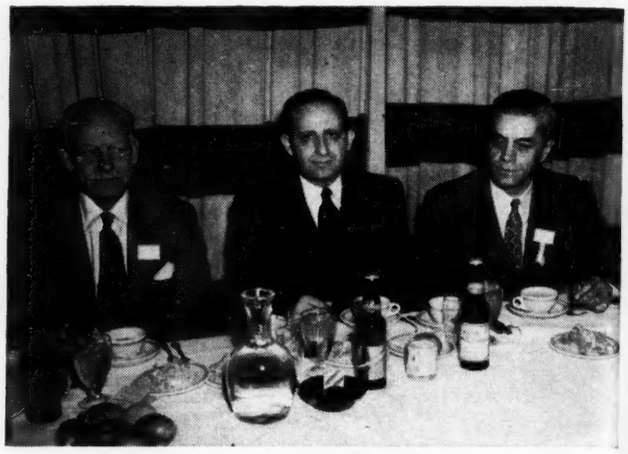
This liquid seal may be varied with the gas being pumped. On solvent work the percentage of recovery may be increased by using a suitable liquid as the pump seal and recirculating this liquid. Because of the complete lack of internal lubrication, the solvent cannot become contaminated.

Nash Vacuum Pumps are furnished in a wide range of capacities up to 5,000 cubic feet per minute. In single stage design they efficiently maintain vacuums up to 27 inches of mercury, and in two stage design vacuums above 29 inches.

THE NASH ENGINEERING COMPANY

226-A S. WILSON ROAD • SOUTH NORWALK, CONNECTICUT • U. S. A.

CONVENTION REPORTS



BREWING CHEMISTS HAVE LUNCH

From left: G. S. Brattan, P. P. Gray, incoming president; M. M. Landauer, J. S. McCourtney, G. Gelman, and C. Rask, retiring president.

Brewing Chemists Hail Results Of Cooperative Studies on Quality

Brewery and malthouse quality control is given the accent in technical talks at St. Louis gathering

By Elsie Singruen, Consultant, Chicago

IMPROVED quality and methods to achieve it in the brewery and malthouse were the main topics at the annual meeting of the American Society of Brewing Chemists, in St. Louis, April 28 to May 1st. The technical sessions got underway with reports on collaborative studies carried out during the year by the technical subcommittees, under the chairmanship of Paul R. Witt, Jr., Northwestern Malt & Grain Co., Chicago.

Sampling

Correct evaluation of raw materials and products, the reports showed, depend to a large extent on proper sampling methods. A study of present procedures by statistical methods has demonstrated the necessity for the establishment of adequate sampling methods and sample sizes to assure samples for analysis representative of the entire lot. This is particularly true with bulk materials such as grains.

Factors making sampling difficult are segregation, periodicity and personnel. To obtain a representative sample from a large lot, where segregation has occurred, or from a mixture of lots where mixing is not uniform, the large lot must be considered to be made up of sublots, each of which must be sampled and the individual samples mixed thoroughly. If this sample is too large, it must be quartered down properly. The effects of periodicity are most noticeable in sampling from production lines. In this case, it is important not to follow a pattern in the sampling procedure.

In order to determine "adequate sample size," the degree of accuracy required must be arrived at by a study of the amount and range of variation. Variations in results are influenced by the Law of Distribution and are predictable by calculation.

The application of the statistical methods to the interpretation of results obtained with various inspection procedures is helpful in developing suitable methods of sampling for general use by industry.

Solid Content in Yeast

Variations in the "total solid" content of surplus yeast occur, due to autolysis and fermentation of residual sugars, unless the sample is analyzed promptly. If immediate analysis is impractical, the yeast sample must be kept under refrigeration below 41 deg. F. Delay for more than 17 hr. makes results unreliable. If proper precautions are taken with surplus yeast, the present method of the ASBC gives satisfactory agreement between results of different laboratories.

Beer Bottles

Undue losses of bottles in the brewery occur occasionally due to deviations from standard specifications, such as weight, capacity, diameter, thickness of glass, height and profile of the bottles. By taking bottles as received and following them through the plant—measuring breakage at various points—it is possible to detect abuses in shipment, operating losses caused by in-

ASBC OFFICERS

President—P. P. Gray, Wallerstein Laboratories, N. Y. C.
1st Vice-President—C. A. Dayharsh, Ruppert Brewing Co., N. Y. C.
2nd Vice-President—Stephen Laufer, Schwarz Laboratories, N. Y. C.
Secretary—Frank Connery, Ballantine, Newark, N. J.
Treasurer—W. G. Artis, Rahr Malting Co., Manitowoc, Wis.

herent weakness in the bottles, and flaws in equipment installations.

One factor found to be responsible for appreciable losses of beer bottles is the presence of hair-line cracks and other surface defects in the crown finish of bottles. To detect these defects, a solution of a penetrant is sprayed on the crown finish and dried by means of warm air. Following this treatment the bottles are passed through a fine atomized stream of calcium carbonate carrying a high static electric charge obtained by passing the stream through a hard rubber tube at high velocities. Any defects present are clearly indicated by a deposit of carbonate. Tests on large numbers of bottles from two sources revealed 2 percent and 4 percent finish defects, respectively. Fire flashing of crown finishes was suggested as a means to minimize the incidence of such defects.

Twelve-ounce export bottles were less apt to have defects than single trip and 32 oz. bottles. Re-used bottles showed larger numbers of defects caused by abuse.

Color and Turbidity

Several methods and reference color standards are now available for the determination of color in wort and beer, which can serve as checks on each other. Visual dye color reference solutions, photometer reference colors and dichromate solutions have been shown to remain stable with only minor changes in color values evident after two years. Accurate, reproducible procedure has been developed for the determination of turbidities by photoelectric means in a standard instrument.

Enzymes

Diastatic enzymes and their release from barley during malting came in for a great deal of discussion, especially with respect to the effect of proteolytic preparations. Eric Kneen and J. M. Spoerl of the Kurth Malting Co., Milwaukee, Wis., revealed the existence of an enzyme active in the conversion of the limit dextrins which they designated as "limit dextrinase." This enzyme supplements the activity of the alpha and beta amylases by transforming the non-ferementable limit dextrins into reducing sugars. According to Paul R. Witt, Jr., Northwestern Malt & Grain Co., Chicago, alcohol production can be increased in malt converted corn mashes by a secondary conversion conducted with malts kiln-dried under 135° F. Alcohol recoveries were reported to have increased threefold in comparison with alcohol yields obtained with malts dried above this temperature. It was indicated that an enzyme other than alpha or beta amylase was responsible for the high alcohol production.

Specific Gravity

Many operations associated with brewery control depend upon the measurement of specific gravity of aqueous solutions. L. Atkin, I. Stone, P. P. Gray and M. Feinstein of the Wallerstein Laboratories, New York City, adapted for brewery control the gradient tube method as originated by Linderstrom-Lang and modified by Lowry and Hunter. The specific gravity gradient tube can be applied in the brewery to worts, diluted sirups, fermenting worts and beer. It is especially suited for checking the course of laboratory fermentations. Since in suspensions of brewers yeast the specific gravity has been found to be a function of yeast solids, this instrument may be useful in a quick and reliable method for the determination of yeast solids.

The determination of minute traces of polyvalent metal ions in beer is essential in order to control certain types of metal-protein turbidities. As little as 0.2 ppm of tin have been reported to unbalance the existing colloidal system in beer when it is exposed to low temperatures. O. R. Alexander and V. M. Biske of the American Can Co., Maywood, Ill., described a procedure by which it is possible to detect tin in beer in concentrations from 0.01 to 1.0 ppm, with a probable error of 10 percent, or 0.01 ppm. With minor modifications, this method may be applied to the detection and estimation of traces of aluminum, zinc, and possibly other metals.

Colorimetric methods for silica and tannin in worts and beers were developed by I. Stone and P. P. Gray of the Wallerstein Laboratories. Most of the silica found in beers and a large proportion of the tannin are derived from the husk of the malt. The chance of beer picking up silica from the bottle, when stored for long periods, is negligible.

Taste tests applied to beer give more reliable results when most variables were controlled, according to R. R. Slater and G. K. Frenkel of the Schwarz Laboratories, New York City. In the "paired comparison" technic, only one pair of samples is judged at a time. It may be made up of different or identical samples. Only preference or the lack of it is recorded.

NFI Develops Program

Fisheries body forms technology committee, expands promotion at 3d annual convention, in San Francisco

FORMATION of a technological section within the framework of the National Fisheries Institute, an expanded promotion campaign to raise $500,000 for an all-industry campaign this year, and report of a move to bring about savings up to $20,000,000 annually in freight rates were among the tangible results of the Institute's third annual convention in San Francisco.

The technological section, according to Dr. W. F. Hampton, General Foods Corp., Boston, is being organized to provide a medium of exchange of technical and scientific information within the industry and to promote technological research and development. The section will collaborate with other research institutes and governmental agencies, according to Dr. Hampton, in an effort to determine scientific health elements in fish. Food values and use of byproducts that might hitherto have been overlooked will be investigated. The group's first report will be made at the next annual convention.

The new promotion campaign, to be developed by the advertising and publicity committee, faces the task of changing the eating habits of the American people in relation to fish and shellfish, in the opinion of the committee chairman, William E. Eardley, Seattle. J. L. Alphen, president, General Seafoods Corp., proposed that all segments of the industry be invited to take part in the campaign. "The whole industry, from producer to distributor, must" he said, "provide the funds to protect us against further inroads of other products."

The freight rate savings are expected to be brought about through the cooperation of the Department

of Agriculture, which for the first time, has assigned a freight rate specialist to study the requirements of the fishing industry. In collaboration with the Institute's transportation committee, USDA will evaluate the final effect on transportation charges of ICC's permanent order, which is due before June 30. Then it will be decided whether the time, effort and expense are justified in undertaking to file a formal complaint before the commission. It is the department's belief that a more equitable freight rate than now prevails will be secured for the fishing industry and that savings up to $20,000,000 are possible through such freight rate adjustments.

Observing that the U. S. has been asleep while other nations operated whole fleets of research vessels and explored new fishing grounds, Rep. Thor C. Tollefson, chairman of the House committee on Fish & Wildlife, cited the $20,000,000 expended by this country, under lend-lease, to outfit 23 refrigerated, canning and research fishing ships for Russia. He added that Russia is still using them. On the other hand the U. S. has only one research vessel, the *Albatross III,* recently commissioned at Gloucester, Mass. Mr. Tollefson pointed out that the U. S. fishing industry is "on its own" to a greater degree than any of its competitors, and therefore the job was a challenging one.

HEADS FISHERIES GROUP

New NFI President Carlton Crawford owns the Crawford Packing Co., Palacios, Tex.

A leak proof package, wrapped by machine was suggested for the industry by R. R. Smith, Cellophane division, DuPont de Nemours & Co. He cited results of a study on frozen fish buying, conducted by *Parent's Magazine,* in which 58.9 percent of those interviewed preferred to buy frozen fish when it could be seen. Variety marking was demanded by 95.9 percent. Brand names were sought by 75.7 percent, while 80.3 percent wanted instructions for defrosting. A further study showed 82 percent wanted recipes, and 86 percent asked that number of servings be marked on the package. Transition of packaged fish from a week-end specialty to a six-day-a-week item has resulted in sales increases up to 300 percent. The final answer to the packaging of fish, added Mr. Smith, must come from the packer. Few retailers have the facilities for such an undertaking.

Carlton Crawford, past president of the National Shrimp Canners Assn., was elected president of the Institute; W. C. Eardley, Eardley Fish & Fillet Co., Seattle, Wash., is secretary, and R. M. Meehan, Washington, D. C., treasurer. Regional vice-presidents are: F. M. Bundy, Gorton-Pew Fisheries, Gloucester, Mass.; Jerome Kiselik, Flag Fish Co., New York City; Francis Taylor, Warren Fish Co., Pensacola, Fla.; B. W. Shipman, Marine Products Co., Los Angeles; Charles Alhadeff, Whiz Fish Products Co., Seattle, Wash., and E. M. Concannon, Walker's Fulton Fish Co., Chicago.

Predict Dry Milk Shortage

Note lower whole milk output, more demand for liquid, evaporated at 23rd American Dry Milk Institute meet

PRODUCTION of dry milk, during 1948, may be short of demand by an estimated 100,000,000 lb., declared H. R. Leonard, chairman of the board, American Dry Milk Institute, in opening the 23rd annual meeting of the Institute, April 20, in Chicago. Decreased whole milk production, increased demand for liquid milk and evaporated milk, and lower carry-over of dry milk from 1947 combine, he said, to create a serious shortage of these products for the balance of the year.

Leonard substantiated his prediction with figures, citing February production of nonfat milk solids as 22.6 percent below that of the same month last year. Production of dry whole milk during 1948 will be about 150,000,000 lb.—15,000,000 lb., or 10 percent, less than last year. Sales, including government purchases, are expected to remain about the same as in 1947.

Although production of fluid milk has been declining, its consumption has increased considerably since 1939. Hugh L. Cook, a member of USDA, University of Wisconsin, Madison, Wis., pointed out a way to utilize available milk supplies most effectively. He recommended an increase in the manufacture of dry milk products to offset the decline in butter production and the practice of feeding the separated milk to animals.

Separating milk on the farm tends to reduce the amount of nonfat milk solids, including proteins, minerals, riboflavin and water-soluble vitamins, going into human food channels. Actually, Cook said, a much greater quantity of milk vitamins can be available for human food than now goes into consumption because much of the portion of milk containing water-soluble vitamins never reaches those channels. Production of nonfat dry milk has increased income to dairy farmers and benefitted consumers.

Additional development and further improvement must be made in dry milk products to attain higher acceptability and general utilization as a food for the Armed Forces, advised Col. Charles L. Lawrence, QMC Food & Container Institute for the Armed Forces, Chicago. Dry milk which can be mixed in a bowl as a palatable liquid alternate for fresh milk is the type of product the Army hopes can be developed. Uniformity of product, useful methods of testing its specifications, in-

(*Continued on page 212*)

AMDI OFFICERS

H. R. Leonard, Twin City Milk Producers Assn., St. Paul, Minn. was re-elected chairman of the board. Other officers are: vice-chairman, Paul Young, Golden State Co., San Francisco, Calif. and secretary-treasurer, M. J. Metzger, Bowman Dairy Co., Chicago, Ill., both re-elected.

"ARTISTRY IN PICKLES... that's what it is"

*MAYBE Emily Post wouldn't like the idea, but any hostess who doesn't serve this product right out of the jar is missing a good bet in appetite appeal. Just look at that combination. A layer of sweet gherkins, a layer of sweet cauliflower, with onions and pimiento nestling at the top . . . sure makes a product that's hard to resist.**

OF COURSE that snappy looking Crown Screw Cap isn't any second-rate attraction either. Decorated in four colors to harmonize with the label design, it lends a distinct note of quality that goes hand in hand with this product. And, of course, as in all Crown Screw Caps, the Deep Hook Thread gives extra sealing pressure with any given application force . . . an assurance of dependable protection. Crown Cork & Seal Company, Baltimore 3, Maryland. *World's Largest Makers of Metal Closures.*

**Packed by Vita Food Products, Inc., of Maryland, Chestertown, Md.*

CROWN CLOSURES

Approved by millions of housewives

NEW PACKAGES & PRODUCTS

Flour and Cereal in New Shiny Cartons

KING MIDAS FLOUR MILLS, Minneapolis, Minnesota, has added a new two-pound size carton to its package line. To provide an especially sanitary protection for the food items, a processed high gloss paper is used for an overwrap label.

The new carton provides a consumer size unit suitable to modern grocery merchandising. Side and back panels give recipes. The company's silverware premium plan is also featured on each side of the carton.

New Shortenings in 2-lb. Metal Containers

KINGAN & Co., Indianapolis meat packer, is now offering two of its new products in the shortening field —Seafoam Shortening and Tasti-Creamed Lard. They will be marketed in two-pound metal containers as companion products. The label designs feature the Kingan colors of blue, buff, and red.

Seafoam is a bland, pure white, creamy-textured, odorless, tasteless shortening made from a combination of animal and vegetable fats. The fats are blended together by a special manufacturing process, to become partially hardened and completely deodorized. The shortening has a melting point of 119 deg., a smoke point of 420 deg. When used for deep-fat frying, this shortening will not pick up odors, and therefore can be reused in cooking a variety of foods. It requires no refrigeration and is said to highly digestible. The company recommends its use for pastry, bread and cake making, as well as pan frying.

Tasti-Creamed Lard is now being processed with new methods to become whiter, creamier in texture, and easier to mix. It is recommended as a superior shortening for piecrusts, biscuits, fried meats and other foods in which added flavor is desired.

A third new Kingan shortening, Kingex, was recently developed for commercial users. It is a product similar to Seafoam and is available in 50, 100, and 380 lb. drums.

Apple Drink

A PURE apple drink has been announced by the Apple Jackie Co., Brooklyn, N. Y. The company manufactures a concentrate of apple juice which has been depectinized. The volatile aroma is recovered and added back in the proper proportion to the finished product. The concentrate is used in sirups to make beverages with either plain or carbonated water.

More than three apples are required to produce the flavor in each 7 oz. bottle of finished Apple Jackie beverage. The company states that 8 ozs. of concentrate is sufficient to flavor one gallon of sirup which in turn produces six gallons of finished drink.

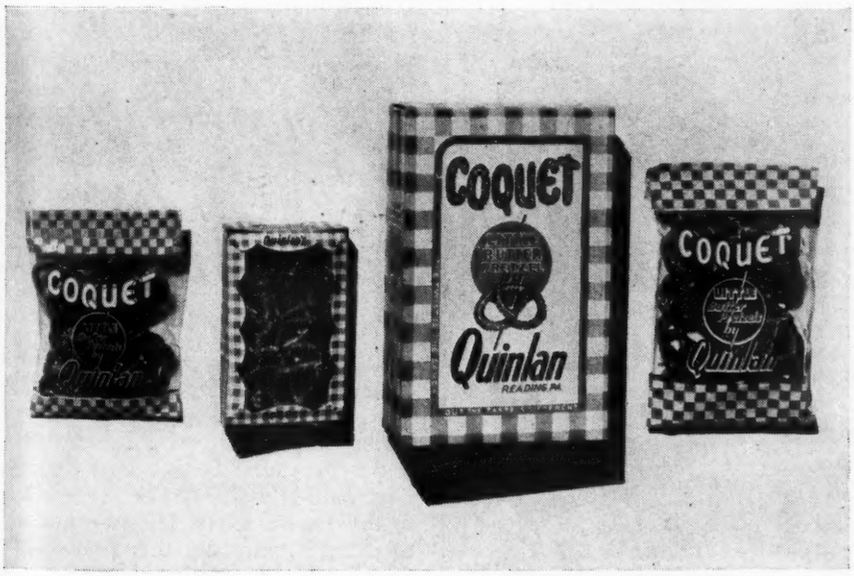
Knox Glass designed the bottles and Crown Cork & Seal designed the crowns. Franchises are now being offered to bottlers throughout the U. S.

Pie Fillings Save Time for Busy Cooks

INDIVIDUAL ready-to-use pie fillings introduced by Airline Foods Corp. make it easy for anybody to bake pies at home. The products are offered in 16 oz. jars and are made with fresh eggs, butter, fruit, sugar and flavorings so that no other ingredients need be added. The contents emptied into an 8-inch pie shell and baked for 20 minutes result in the finished pie.

In addition to mince meat and fruit pie fillings, cream desserts are available in chocolate, french vanilla, and butterscotch flavors. The back label on the jar gives full instructions for pies, one-minute desserts, and rich ice cream.

This new line will be sold through all grocery channels, wholesale grocers, chains, super-markets and department stores.



Thin Butter Pretzels with New Oomph

QUINLAN'S COQUET, a new thin, crisp pretzel, has been introduced to the retail market by the Quinlan Pretzel Co., Reading, Pa. Pretzels owe their beginning to the monks in southern Europe in the 15th century, and Ann Quinlan has furthered the art with her creation of the first butter pretzel, measuring 2 in. long and 1¼ in. high.

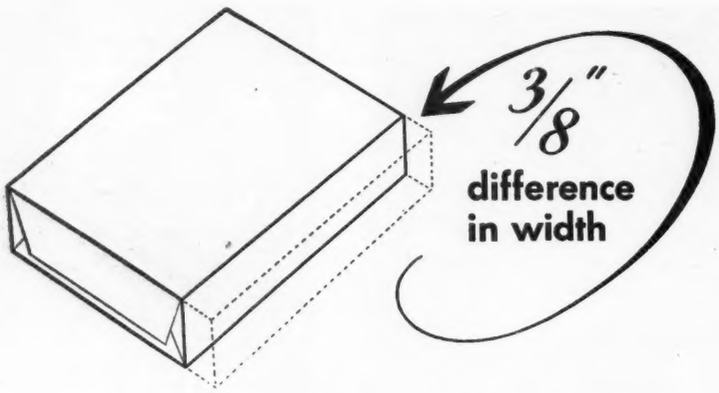
Products are packaged in moisture proof Cellophane bags, Cellophane wrapped boats and boxes, and 7 lb. moisture proof containers.

BE SURE WITH

Paksure
FOOD PACKAGINGS

A complete line of wrappings, bags, envelopes and boxes, etc. for all food packaging including candy and frozen foods. Stock or original packagings designed by specialists for sure protection and "eye appeal". Consult us about your packaging problems, today.

PACKAGING DIVISION
E. W. Twitchell Incorporated
777 Public Ledger Bldg. Philadelphia 6, Pa.



Automatically makes allowances for variations in width

New Model FF Frozen Food Wrapper

Dimensional differences in frozen food cartons, which result from freezing, cannot cause machine jams or mar the wrapping turned out by the new Model FF. For the FF – designed especially for wrapping frozen foods – has a special spring-mounted elevator well which easily accommodates packages varying as much as ⅜" in width.

This is but one of the many desirable features that have made the Model FF so popular with frozen food packers . . . And its cost-cutting speed of up to 100 packages per minute keeps operating expenses at a minimum.

The Model FF is adaptable to virtually any plain or printed wrapping material. The end-fold it makes locates printing on *the top flap of the fold,* thereby increasing visibility.

Manufacturers in other fields are finding the Model FF ideally suited for wrapping such items as cartons of butter, oleomargarine, meat products in trays, etc. Perhaps your product, too, could benefit from the uniformly-attractive, low-cost wrapping produced by this machine. Why not consult our nearest office for complete information?

PACKAGE MACHINERY COMPANY
Springfield 7, Massachusetts
NEW YORK CHICAGO CLEVELAND ATLANTA DENVER
LOS ANGELES SAN FRANCISCO SEATTLE TORONTO

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

Syrup With Can-Appeal

MOTHER'S PANTRY SYRUP packed in cone-topped, lithographed metal cans is a newcomer to the ranks of can-packaged items. Allied Food Industries, Inc., Perth Amboy, N. J., manufactures the product with a composition of 85 percent pure cane sugar and 15 percent maple sugar.

The new container is expected to find wide acceptance among grocers because of its display potential and the reduction of breakage possibility in stacking, shipment and storage.

Pan Ready Fish

NORTH PACIFIC FROZEN PRODUCTS Co., Bellingham, Wash., is packaging fillets of sole, rockfish, ling cod, cod, flounder, sable fish, salmon, and

halibut in visual-type 1 lb. cartons, under the name Pacific Pan Ready. Distribution so far has been confined to the Pacific Coast but is expected to extend nationally this season.

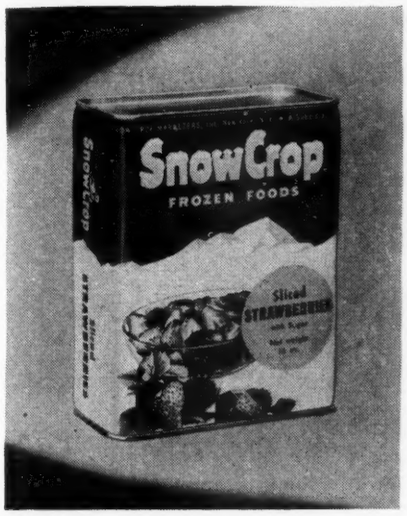
Full-Color Package

SNOW CROP MARKETERS, INC., national distributors of frozen foods, has introduced a new package for its full line of products.

Designed with "extra sales appeal", each package features a product in a full-color reproduction that

depicts the particular fruit or vegetable in a combination of appetite-appealing fresh and processed form.

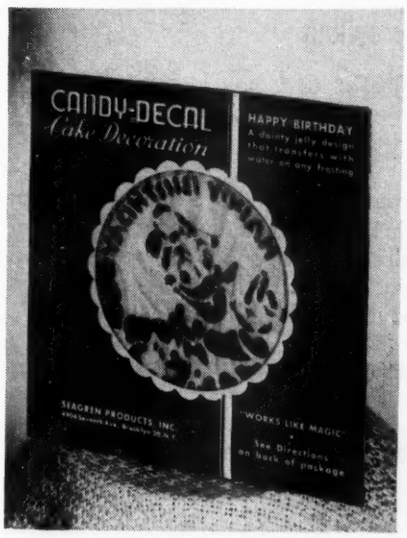
The established Snow Crop identi-



fication of a bright red circle stating the contents, is being featured on the new package.

Candy-Decal for Cakes

EVERY mother can be her own pastry chef with a new ready-made cake decoration unit manufactured by Seagren Products, Inc., Brooklyn, N. Y. Consisting of a jelly design that transfers with a little water to



any type of light-colored cake frosting, the pastry decal comes packaged in a blue cardboard container with a cutout center to show the design. The design itself is mounted on a sheet of tissue paper and covered with Cellophane. Four simple directions for the transfer of the decal are listed on the back of the cardboard.

Marketed under the name "Candy-Decal", the decorations come in a variety of designs.

WHERE CAN YOU USE?

CLEAR JEL

a NEW Food Starch

DERIVED FROM AMYLOPECTIN STARCH

UNIQUE IN

- Unexcelled clarity that will not cloud
- Flavor-emphasizing blandness free from cereal taste and starchy sensation
- Excellent keeping qualities that insure unusually long shelf life
- Resistance to breakdown on prolonged cooking
- Ability of pastes to recover original body and fine texture after freezing
- Pastes Properties: Non-cohesive • Non-jelling; Non-skinning • Heavy-bodied
- Commercially available in large quantities

DESCRIPTION: CLEARJEL is a modification of Amioca which is obtained from domestic bred waxy maize. CLEARJEL differs from Amioca, tapioca, potato and other tuber-like starches. It does not yield a rubbery cohesive paste but instead gives pastes with clear non-cohesive creamy textured, heavy bodied properties. It should be compared with natural gums such as tragacanth, karaya and other stabilizers.

Like Amioca, CLEARJEL is unique among starches because it consists entirely of amylopectin. It is believed to be a branched or non-linear polymer of glucose. Its molecules, being highly hydrated and unable to associate, give rise to heavy bodied, clear pastes free from any tendency to thicken or jell on ageing. Unlike Amioca, CLEARJEL pastes are non-cohesive.

PHYSICAL APPEARANCE: A white powder resembling ordinary corn starch.

CHARACTERISTICS: In 15 parts of water it will cook to a smooth, heavy bodied paste which is non-cohesive and characterized by excellent clarity, bland flavor and resistance to breakdown on prolonged heating even under acidic conditions.

POSSIBLE APPLICATIONS: CLEARJEL is especially recommended as a stabilizer for fruit pies and tarts. Its clarity permits fruit colors to retain their original brilliance and adds the extra eye appeal of tempting, full bodied fruit. Its bland flavor actually adds tang to natural fruit flavors. All of these properties remain undiminished after many days of shelf life. CLEARJEL is also excellent for unbaked, frozen fruit pie fillings. Its pastes recover their original body after freezing. CLEARJEL can be used in a frozen chop suey base for chow mein and in fresh chop suey. It gives the sauce a fine texture and a soft jelling tendency. CLEARJEL offers the confectioner a stabilizer for caramels and marshmallows that not only enhances their eating qualities but also increases yield because of its higher moisture balance and added bulk. CLEARJEL will not cloud or set in cream sauces, clear gravies, a la king foods, etc. And it can be used as a pure food dusting starch.

WE'RE READY to match our research and laboratory efforts with yours in further exploration of CLEARJEL applications to your products. Address: National Starch Products, Research and Development Laboratories, 270 Madison Avenue, New York City. Plants: Dunellen, N. J., Chicago, Indianapolis and San Francisco. In Canada: Meredith, Simmons & Co., Ltd., Toronto and Montreal. In Holland: Nationale Zetmeelindustrie, N. V. Veendam.

National
STARCH PRODUCTS

STARCHES — *AND SPECIALTIES WITH EASILY DEMONSTRATED SUPERIORITY*

Do you know the answers to this food profit quiz?

1. Is the preference for glassed foods stronger among

☐ YOUNG HOUSEWIVES OR ☐ OLDER HOUSEWIVES?

ANSWER: Young housewives! Authority: a national consumer survey of packaging preferences. Here's *proof* of the growing swing to glass! Here's your opportunity to win a bigger share of the 14,000,000 "newly marrieds," now establishing their buying habits.

2. Are consumers willing to pay more, if necessary, for products in glass?

☐ YES ☐ NO

ANSWER: Yes. 57% of the consumers who prefer glass say they are willing to pay more. But your potential on this large volume of impulse sales—*extra* sales—can be rapidly destroyed by unjustified price differentials.

3. For which of these grocery items do housewives overwhelmingly prefer glass?

☐ PEACHES ☐ PEARS ☐ FRUIT COCKTAIL

☐ BABY FOODS ☐ TABLE SYRUP ☐ BEETS

☐ CARROTS ☐ BEER ☐ SALAD OR COOKING OIL

ANSWER: If you checked every box you are absolutely right. Glass sales successes follow a consistent pattern—for products that look good (fruit cocktail)—for greater convenience (corn syrup)—and for safe re-storage of unused portions (baby foods).

(Here's a current advertisement spotlighting beets in Duraglas containers.)

4. How many Duraglas Container campaigns are working for you by constantly selling products in glass?

☐ ONE ☐ TWO ☐ THREE

ANSWER: Three! One in the Saturday Evening Post—another in Ladies' Home Journal, Good Housekeeping, McCall's, Parents', and Sunset—and a third in The American Weekly. Each sells the advantages of *glassed* products directly to *your* customers!

SCORING

Three or four right . . . you are reaping full profits by capitalizing on the many sales advantages of glass-packed products!

Two right . . . tests in stores will prove you increase sales volume by packing in *glass!*

One or none right . . . other packers are winning customers at your expense—and because glass packaging creates *impulse* sales, you are losing the substantial amount of extra sales your products would gain in glass. 7 out of 10 consumers prefer products in glass!

Duraglas TRADE MARK REG. U.S. PAT. OFF. **CONTAINERS SELL ON SIGHT**

OWENS-ILLINOIS GLASS COMPANY • Toledo 1, Ohio • Branches in Principal Cities

FOOD INDUSTRY NEWS

Food Growers Warned Against Free Use of New Insecticides

Dangers in use of materials for which human tolerances have not been established are spotted by food brokers

FOOD & DRUG ADMINISTRATION is carrying on a campaign to publicize the fact that some of the newer insecticides are being used very widely and perhaps too freely when very little is known about their effect on human beings—except that they are poisonous.

In talks before a dozen groups this spring, Food & Drug researchers will report on the status of the human hazard aspects of each of the new materials—including the hazards from residues remaining on food crops.

Sky-rocketing sales of these new insecticides have already brought forth official warnings to its members by the National Canners Assn. not to accept fruits or vegetables that have been treated with these insecticides. Other food groups have taken similar action.

There is widespread interest in the problem, but little can be done to speed up the process by which the characteristics of the new economic poisons would become as well known and safe to use as older poisons, such as the arsenicals and fluorides. At least three years of intensive tests are required before definitive tolerances can be recommended, according to government administrators.

Food & Drug officials have issued warnings against using the following poisons without first having the fullest information from either state or federal authorities: Benzene hexachloride, chlordane, chlorinated camphene, tetraethyl pyrophosphate, and parathion.

F&DA is nowhere near the stage of issuing standards of tolerances for any of these poisons. Hence, they view with a jaundiced eye the advertising circulars of some insecticide merchandisers, which recommend their use on all crops—including fruits and vegetables—with only the most general precautionary statements.

F&D researchers point out that standards of tolerance have not yet been set for DDT, the oldest of the "new poisons", even though it has been on the market since 1943. The agency's investigations of DDT are well along, and it is possible that within another 10 or 12 months enough information may be available to warrant consideration of hearings to discuss tolerances.

The Bureau of Entomology & Plant Quarantine of the Department of Agriculture, in similar warnings, has cited the experience of some potato growers last year. They found out—the hard way—that applications of the chemical to the soil for the purpose of controlling wireworms gave their potatoes a musty taste. Use of the insecticide on the foliage of other vegetables—carrots, turnips, or peas, for instance—also has resulted in giving the edible part of the plant an off-flavor.

While standards of tolerance and recommendations from F&DA to application of DDT to particular crops may be forthcoming in the not too distant future, officials point out that the problem is more difficult in the case of the newer insecticides. The chemistry of DDT is relatively simple, whereas the chemistry of others of the new insecticides is virtually unknown. Food & Drug have these new poisons under intensive investigation, but at present these studies are only in beginning stages.

At every opportunity, the Food & Drug men emphasize that the new poisons should not be used on fruits or vegetables when foliage or fruit that is to be used as food is still on the plants, unless the residues can and will be removed by weathering, washing, or stripping.

See Tight Tin Supply For Another Two Years

FOOD processors dependent on tin-lined containers learned last month that the scarce metal will remain tight at least until 1950. This was the outlook as seen by the International Tin Study Group, an informal organization of some 70-odd experts from more than a dozen countries.

According to the group, this year's world mine production of tin would be but 150,000 long tons, compared with an earlier estimate that it would be 163,000 tons. Forecast for 1949 tin production was also dropped down a few notches—from 201,000 long tons to 170,000.

Wide World

SHOPPING BY CONVEYOR

Two conveyor belts enable these Houston, Tex., shoppers to take it easy while selecting their groceries. Packages pass along counter conveyor from which they are picked by shopper, who is given a number when entering store. The number is marked on commodity, which is then carried to checker by overhead conveyor. The entire stock of the store makes a complete circuit in five minutes.

Institute of Food Technologists

Hotel Benjamin Franklin, Philadelphia, Pa. June 6, 7, 8, 9, 10, 1948

Sunday, June 6
Morning

Council Meeting.
President G. J. Hucker, presiding.

Afternoon and Evening

Registration.

Committee Meetings.

Evening

Round Table Discussion.
Color Changes in Foods, led by M. A. Joslyn, University of California, Berkeley.

June 7
Morning

General Session.

Address: President G. J. Hucker.

General Announcements.

Planning for the Effective Utilization of Scientific and Technological Personnel of the Food and Container Industries in the Event of a National Emergency.
Col. Charles S. Lawrence
Commanding Officer
Quartermaster Food & Container Institute
Chicago, Ill.

What Food Technology Has Done for Our Business.
H. J. Heinz II
Pres. H. J. Heinz Co.
Pittsburgh, Pa.

Survey of Food and Nutrition Research.
LeRoy Voris
Nutrition Research Council
Food & Nutrition Board
Washington, D. C.

Afternoon

Concurrent Session A—General Problems of the Technologist

Problems of the Technologist in Successful Maintenance of Quality in Frozen Poultry
T. H. Ramsey
Birdseye-Snider Div., General Foods Corp., New York.

Problems of Maintaining Quality of Controlled Distribution.
Fred R. Pierce
Sales Manager
Tasty Baking Co.
Philadelphia, Pa.

Methods of Control in Production and Marketing of Certified Milk.
J. Howard Brown
Johns Hopkins University
Baltimore, Md.

Sanitary Construction of Floors and Buildings for Food Plants.
C. Drehmann
Drehmann Paving & Flooring Co.
Philadelphia, Pa.

Concurrent Session B—Ion Exchange Resins

Ion Exchange Techniques Applied to the Food Industry
James C. Winters and Robert L. Dean
The Resinous Products & Chemical Co.
Philadelphia, Pa.

Use of Ion Exchangers in By-Product Recovery of Pineapple Waste
Geo. E. Felton
Hawaiian Pineapple Co.
Honolulu, Hawaii

Commercial Ion-Exchange Purification of Sugar-Bearing Solutions
B. N. Dickinson
Chemical Process Co.
Redwood City, Cal.

Ion Exchangers in Food Processing
A. B. Mindler
The Permutit Co.
New York, N. Y.

Evening

Boat Ride on the Delaware.

June 8
Morning

Concurrent Session C — Thickening and Jellying with High Polymers

Chairman: George L. Baker
University of Delaware
Newark, Del.

Physical Chemistry of Gelation of High Polymeric Systems
Rudolf Speiser
Department of Chemistry
Ohio State University
Columbus, Ohio

High Polymer Acid-Demethylated Pectinates and Their Gelation.
G. W. Woodmansee and G. L. Baker
Univ. of Delaware
Agricultural Experiment Station
Newark, Del.

High Polymer, Alkali-Demethylated Pectinates and Their Gelation.
Glenn H. Joseph and E. F. Bryant
California Fruit Growers Exchange
Corona, Cal.
A. Harris Kieser
Exchange Lemon Products Co.
Corona, Cal.

Recent Developments of Practical Significance In the Field of Pectic Enzymes.
Dr. R. J. McColloch
N. Y. Agricultural Experiment Station
Geneva, N. Y.

Enzyme Demethylated Pectinates and Their Gelation.
C. L. Hills
Eastern Regional Research Laboratory
Philadelphia, Pa.
H. H. Mottern
H. J. Heinz Co.
Pittsburgh, Pa.
G. C. Nutting
Eastern Regional Research Lab.
Philadelphia, Pa.
Rudolph Speiser
Dept. of Chemistry,
Ohio State Univ.
Columbus, Ohio

Gelation with Acid-Precipitated Pectinates
H. S. Owens
Western Regional Research Lab.
Albany, Cal.

Continuous Manufacture of Jellied Substances at Low Temperature
G. T. Reich
Philadelphia, Pa.

Concurrent Session D—Sterilization

Chairman: George L. Marsh, University of California, Berkeley, Cal.

Evaluation of the Effects of Heat Processing Upon the Organoleptic Quality of Canned Foods.
C. Olin Ball
Consulting Food Technologist
Maumee, Ohio

Exploration of the Effects of Strong Radio-Frequency Fields on the Micro-Organisms in Aqueous Solutions.
George H. Brown and Wendell C. Morrison,
RCA Laboratories
Princeton, N. J.

Spores and Spore Germination.
O. B. Williams
University of Texas
Austin, Tex.

A Technique for Studying Resistance of Bacterial Spores to Temperatures in the Higher Range.
C. R. Stumbo
Director of Research
Food Machinery Corp.
San Jose, Cal.

Concurrent Session E — Food Acceptance Testing

Chairman: Virgil O. Wodicka
Libby McNeill & Libby
Chicago, Ill.

Taste Perception and Taste Preferences of the Consumer.
Katheryn E. Langwill
Professor of Nutrition
College of Home Economics
Drexel Institute of Technology
Philadelphia, Pa.

A Rational Method of Grading Food Quality.
R. P. Plank
Visiting Professor
University of Texas
Austin, Tex.

Some Factors Controlling Sensory Acuity.
Dr. Franz Gaetzel
Permanente Foundation

Panel Testing
Dr. Helen Hansen
Western Regional Research Lab.
Albany, Cal.

Iowa State College

Afternoon

Concurrent Session F—Pectin Standardization.

Chairman: Dr. Z. I. Kertesz, N. Y. Agricultural Experiment Station, Geneva, N. Y.

Standard Use Tests for Pectin Evaluation (Authors to be announced)

The Preservers' Stake in Uniform Pectin Grading.
E. Everett Meschter
American Preserve Co.
Philadelphia, Pa.

Pectin Standardization.
H. H. Mottern
H. J. Heinz Co.
Pittsburgh, Pa.

Color and Quality in Preserves
Z. I. Kertesz
N. Y. Agricultural Experiment Station
Geneva, N. Y.

Methods Used in Standardizing Citrus Pectins
Report, California Fruit Growers Exchange.

Standardizing Apple Pectins.
(Authors to be announced)

Use of Buffer Salt in Grading Pectins.
George L. Baker
University of Delaware
Agricultural Experiment Station
Newark, Del.

Concurrent Session G—General Session

Soil Treatment for Better Foods.
Jackson B. Hester
Dept. of Agricultural Research
Campbell Soup Co.
Riverton, N. J.

Non-Alcoholic Beverages
E. C. Crocker
Arthur D. Little, Inc.
Cambridge, Mass.
Michael P. Vuccassovich
Gorton-Pew Fisheries, Inc.
Gloucester, Mass.

Food for Infants, Invalids and the Aged
E. F. Kohman
Campbell Soup Co.
Camden, N. J.

Comparative Evaluation of Spices
L. C. Cartwright and Robert Nanz
Foster D. Snell, Inc.
New York, N. Y.

New Method for Determination of Infectation in Hops
Benno Lowy
Pacific Chemical Labs.
San Francisco, Cal.

Beer-Soluble Hop Oil for Better Aromatization of Beer.
Benno Lowy
Pacific Chemical Labs.
San Francisco, Cal.

Use of Soybean Flour in Baking Industry.
L. G. Trempel
A. E. Staley Mfg. Co.
Decatur, Ill.

Evening

Banquet

Nicholas Appert Medal Award Presentation

Acceptance Address — The Role of Food Technology in Modern Nutrition
Dr. C. A. Elvehjem
University of Wisconsin
Madison, Wis.

June 9
Morning

Concurrent Session H—Frozen Foods

Chairman: Frank A. Lee, N. Y. Agricultural Experiment Station, Geneva, N. Y.

Use of Liquid Sugars in Freezing of Fruit Products
M. A. Joslyn
Div. of Food Technology
University of California
Berkeley, Cal.

Freezing of Apple Slices.
Wm. B. Esselen, Jr.
University of Massachusetts
Amherst, Mass.

Ascorbic Acid and its Relation to Color and Flavor.
Clarence DuBois, Westport, Conn.

Expansion Effect on Food and Containers Due to Freezing Action.
W. J. Finnegan and R. N. Winters
Food Freezing Research Institute
W. J. Finnegan Co.
Los Angeles, Cal.

A New Crystallographic Method for Study of Changes in Processed Foods.
Hanz Friess, Forschungsanstalt fuer Lebensmittel Frischhaltung, Technische Hochschule, Karlsruhe, Germany.

Effect of 0°F and 15°F Storage on the Quality of Frozen Cooked Foods.
Faith Fenton and Ella Gleim
State College of Home Economics and School of Nutrition
Cornell University
Ithaca, N. Y.

Concurrent Session I—Control

Statistical Quality Control as Applied to the Food Industry.
Marjorie L. Sutherland
Specialized Statistical Services
Evanston, Ill.

Role of Control Instruments in Continuous Food Processing.
Lloyd Slater
Brown Instrument Co.

Insect Control by Contact Methods.
Warren J. Hewes
Capital Chemical Co.
Washington, D. C.

Rodent Control by Baiting and Trapping.
John W. Quinn
Capital Chemical Co.
Washington, D. C.

Methyl Bromide Fumigation in the Sanitation of Food Processing Plants.
F. W. Fletcher
Dow Chemical Co.
Midland, Mich.

Luncheon—Nutrition Foundation Award

Afternoon

Concurrent Session J—Amino Acids

Chairman: M. J. Blish, International Minerals & Chemicals Corp., Roseford, Ohio

The Browning Reactions.
M. L. Anson
Director of Chemical Research
Continental Foods, Inc.
New York, N. Y.

Some Aspects of Non-Enzymatic Browning
Sidney M. Cantor
Director of Research
American Sugar Refining Co.
120 Wall St.
New York, N. Y.

High Pressure Hydrolysis of Proteins
Lloyd A. Hall
Technical Director
Griffith Laboratories, Inc.
1415 W. 37th St.
Chicago, Ill.

The Role of Glutamate in the Seasoning of Certain Vegetables.
E. C. Crocker and L. B. Sjostrom
Arthur D. Little, Inc.
Cambridge, Mass.

Influence of Heat Processing on the Functional and Nutritive Properties of Protein.
Daniel Melnick, Chief
Food Development Div.
Food & Container Institute
Quartermaster Corps
U. S. Army
Chicago, Ill.

Concurrent Session K—Seminar of Technical Fisheries Education.

Chairman: C. R. Fellers, University of Massachusetts, Amherst, Mass.

Speakers: Louis J. Berube, School of Fisheries, St. Anne de la Pocatierre, Quebec, Canada; Dr. L. A. Tarr, Pacific Fisheries Experimental Station, Vancouver, B. C.; Dr. Donald Y. Aska, Chief of the Educational Section, Director of Fisheries, U. S. Fish & Wildlife Service, Washington, D. C.

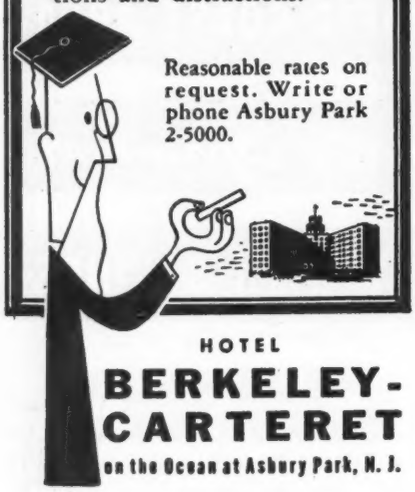
Industrial Plant Trips All Day.

"Automatic" Sprinkler
FOR INVESTMENT PROTECTION
SEATTLE
PORTLAND
IN THE PACIFIC COAST AREA
IT'S "Automatic" Sprinkler
FOR SAFETY WITH SAVINGS
SAN FRANCISCO
LOS ANGELES
No one can definitely measure the cost of a fire, for fire loss is seldom confined to the investment in visible destruction of buildings, equipment and records. The savings resulting from "Automatic" Sprinkler fire protection is, however, measurable in more ways than one.
For example, did you know that an approved "Automatic" Sprinkler installation brings at once a savings in insurance premiums? These savings are applicable toward the cost of installation and with "Automatic" Sprinkler's deferred payment plan, it is possible for you to put in a sprinkler system today . . . get all advantages of protection . . . no depletion of liquid capital . . . and, in a few short years, pay for the installation "out of savings."
A discussion of your fire hazard problems with one of our many representatives who serve the Pacific Coast and all other areas of the Western Hemisphere will enable you to thoroughly evaluate "Automatic" Sprinklers, an important investment today . . . perhaps welcomed protection tomorrow.
"Automatic" Sprinkler
FIRST IN FIRE PROTECTION
DEVELOPMENT · ENGINEERING MANUFACTURE · INSTALLATION
"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO
OFFICES IN PRINCIPAL CITIES OF NORTH and SOUTH AMERICA

When executives go back to school...

Conduct your meetings, banquets, lectures, forums and classes at the convenient Hotel Berkeley-Carteret in Asbury Park. All facilities and service for meetings from 10 to 600. Only 90 minutes from Times Square . . . yet free from interruptions and distractions.

Reasonable rates on request. Write or phone Asbury Park 2-5000.



HOTEL
BERKELEY-CARTERET
on the Ocean at Asbury Park, N. J.

INDEPENDENT LABORATORY Service TO SUIT YOUR NEEDS

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Frozen Fruit Standards Draw Full Discussion

At the beginning of May, after two weeks of hearings on the proposed Food & Drug standards for 62 kinds of frozen fruits, it appeared that the hearings would require at least another two weeks before all who wished to be heard would be able to get their position on the record.

Much of the time during the early days of the hearing was taken up by representatives of the corn sugar interests (Corn Industries Research Foundation) and cane sugar interests (Refined Sirups & Sugars, Inc.), who were intent upon having the record reflect no adverse significance for their products.

Register Objections

Certain objections to particular parts of the proposed standards of identity and fill of container were registered by industry spokesmen:

(1) Most fundamental objection was that which opposed the whole idea of Food & Drug writing these standards in terms of the manufacturing process, rather than in terms of the finished product. Food & Drug has not been consistent in this respect, but has written the frozen fruit standards in this way. Industry representatives feel that such standards are unduly restrictive. They gear their methods to those spelled out in the standards, whereas alternative manufacturing methods, which result in the same finished product, might actually be more desirable. Industry lawyers point out that this question of Food & Drug's authority to write standards in terms of the manufacturing process has never been fully tested in the courts.

(2) Definite opposition has been expressed to the provision that would require the word "cooked" or perhaps "partially cooked" to appear on a package when the fruit has been subjected to heat for the purposes of blanching.

(3) Some clarification has been requested as to the names permitted to be used in describing certain fruit products.

(4) It has become apparent that some packers would want the proposed standards amended to permit the use of a lighter sirup as a sweetener, if desired. The proposed standards, as published in the Federal Register, March 19, require that "light sirup" have at least 40 percent solids as measured by the Brix hydrometer. Some industry spokesmen indicated that 30 percent would be preferable.

(5) Another change would permit the use of the words "sirup unmodified" instead of the words "medium sirup", as the proposed regulations require.

(6) In addition to the optional ingredients permitted by the proposed standards (ascorbic acid, citric acid, and salt), there have been requests made that sodium bisulphite, sulfur dioxide, and pectin should be permitted.

(7) Industry officials have also differed completely with Food & Drug's provision which requires that the amount of sirup used must be above a specified minimum percentage of the total weight of fruit and packing medium. Instead, industry executives argue that the minimum amount of sirup to be required should be an amount that is sufficient to cover the fruit after it has been thawed. The Food & Drug proposals call for maximum percentages of sirup ranging from 25 to 37 percent, depending on the fruit packed.

Wheat Agreement Offers Debatable Provisions

Serious consideration of the International Wheat Agreement was widely predicted when its provisions reached the floor of the Senate. The agreement offers ample grounds for debate to a Republican leadership sensitive to the rise or fall of grain prices.

The agreement was drawn up and signed by representatives of all the major wheat exporting and importing countries, with the two exceptions of Russia and Argentina. If ratified by all the governments concerned, it should—

(1) Guarantee an export market of a total of 500,000,000 bu. of wheat for the next five years for the exporting countries, Australia, Canada, and the U.S.

(2) Guarantee a supply of wheat at a stated maximum price, or lower, to the 33 importing countries.

The U.S. share of the 500,000,000 bu. to be exported under the agreement each year is 85,000,000 bu.

Prices in the agreement call for a maximum of $2.00 per bushel for each of the five years—while the minimum price drops from $1.50 for the 1948-49 year down to $1.10 per bushel for the 1952-53 year. Actual dollars realized by U.S. wheat producers will be a few cents less.

Exporters and importers are bound only as to the quantities fixed in the agreement, but there is nothing to prevent them from arranging additional sales at prices either above or below the agreement price range. The fact that the agreement binds

USDA

HEADS FAO

Norris E. Dodd, Undersecretary of Agriculture, has been chosen Director-General of the Food & Agricultural Organization of the United Nations. He succeeds Sir John Boyd Orr, English food authority.

importers to purchase only 85,000,000 bu. per year from the U.S. does not limit the U.S. to that quantity of exports. However, it does mean that the U.S. has guaranteed to sell the purchasing countries that amount of wheat at the set prices.

Big question—aside from that of Senate approval—is whether Argentina and/or Russia could break up the agreement in wheat surplus years. Neither of these countries is bound by the agreement, and both are big exporters. Hence, each is free to offer to deliver to importing countries wheat at prices that might be below the floor prices set in the agreement. There would be strong pressure thus exerted on the importing countries to break the agreement — for countries, like people, will look for ways of getting out of paying more than they must for the things they have to buy.

Correction

THE printing difficulties that have beset FI during the past several months caught up with us on page 146 of the April issue. Under a picture of an oyster harvesting machine being demonstrated in New Orleans, the caption told about sea gulls troubling fishermen in Connecticut. While this may be a way to cover a lot of territory in little space, the approach is frowned upon by—The Editors.

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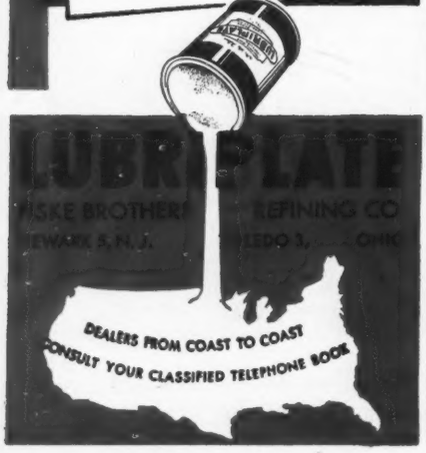

HOLDING FROZEN FOOD CONFERENCES

Problems in the processing and handling of frozen foods are being discussed in various parts of the country by these four leaders. Seated are: F. J. Becker (left), president, National Assn. of Frozen Food Packers, and E. M. Burns, president, National Assn. of Refrigerated Warehouses. Standing: H. C. Diehl, director, Refrigerated Research Foundation, and William Dalton, executive vice-president, NARW.

Court Rules Against Morton Salt Discounts

MANUFACTURERS learned from the Supreme Court, last month, that the Clayton and Robinson-Patman Acts mean what the FTC says they mean about quantity discounts.

Accordingly, manufacturers may not give different quantity discounts to competing customers unless (1) they can justify the discounts on the basis of the savings derived from dealing in large quantities, or (2) the discount was made to meet an equally low price of a competitor.

The 7-to-2 decision in the Morton Salt Co. case, handed down May 3, is another victory for FTC, which only the week before won out in the Supreme Court on price discrimination in basing-point pricing.

Morton was charged with price discrimination that injured competition. FTC based its case on Morton's quantity price discount schedule, which set up the following prices for its top quality blue label brand: (1) $1.60 for less-than-carload purchases; (2) $1.50 for carload lots; (3) $1.40 for 5,000 case purchases in any consecutive 12 months; (4) $1.35 for 50,000 case purchases in any consecutive 12 months.

Only five customers ever benefitted from the $1.35 price, but they were big: American Stores Co., National Tea Co., Kroger Grocery Co., Safeway Stores, Inc., and Great Atlantic & Pacific Tea Co.

There were other quantity discounts questioned, too, involving Morton brands other than blue label.

The Supreme Court overturned the lower-court decision and stood with FTC against nearly every defense raised by Morton. Contentions and answers follow:

(1) Morton said its quantity discounts were out in the open, and available to all.

The Supreme Court said this makes no difference: The price differentials have to be based on actual savings in the cost of quantity selling.

(2) That the FTC failed to prove any actual injury to competition.

Supreme Court said that FTC does not have to prove any such thing. All FTC has to do is find "reasonable possibility" that the discounts "may" have an adverse effect on competition.

The Court answered this by noting that Morton's discounts resulted in price differentials big enough to influence the resale price of salt. This is all that FTC had to have as evidence, the majority said. Furthermore, said the court, Morton's argument that there's an obvious saving in selling in carload lots is all right as far as it goes, but it doesn't go far enough. Morton, or anyone else, has to show that carload-lot discounts are based on actual savings in cost, just as any seller has to

justify discounts for any quantity, larger or smaller than a carload.

(3) Morton said its less-than-carload sales were so small, compared to its total business, that FTC's findings of injury to competition should be overruled.

Supreme Court said there's no possible way to protect a grocer from discriminatory prices except by applying the Robinson-Patman Act to each individual item in his store. And furthermore, the law was passed by Congress with a specific purpose of protecting the small businessman who was not able to buy in large quantities. So FTC was fully justified in its findings on this score.

At only one point did the Supreme Court decide that the Commission had gone astray. In its order against Morton, FTC prohibited the company from selling at different prices to competing wholesalers or competing retailers "provided however, that this shall not prevent price differences, of less than 5c per case, which do not tend to lessen, injure, or destroy competition." The court said FTC must specify what is injurious.

Justices Jackson and Frankfurter, in their dissent, pointed to freedom of action against quantity discounts the majority was giving FTC. The decision allows FTC to prohibit discounts "if there is a reasonable *possibility* that they 'may' have the effect" of lessening competition, Jackson noted. "The difference, as every lawyer knows, is not unimportant," he said, "and in many cases would be decisive."

DAIRY MONTH

This is the poster that will remind you this year that June Is Dairy Month. The poster looks as easy to take as the month.

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EVERY food packer, in striving to improve his production performance, must deal with more or less difficult material handling problems. These are not always quickly solved, and require careful thought by plant and conveyer engineers working together. Experienced plant engineers agree that the use of Mathews methods and Mathews equipment means greater efficiency in material-handling. That is why Mathews Engineers are usually called in on conveying problems which require special attention. The continuous flow methods which they develop are helping these packers to keep worker fatigue at a minimum and to maintain a supply of materials moving through processing, storage and shipping, without re-handling or confusion.

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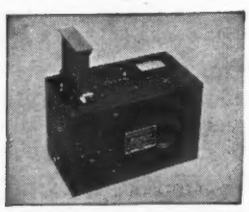

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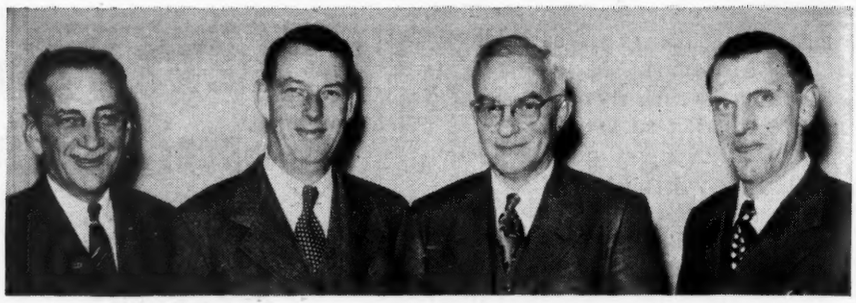

DAIRY SUPPLY OFFICERS

These are the officers elected at 29th annual meeting of the Dairy Industries Supply Assn. Left to right: Wayne D. Jordan, Liquid Carbonic Corp., vice-president; R. E. Olson, Taylor Instrument Co., president; Ralph I. Young, The Sharples Corp., reelected treasurer; and Roberts Everett, reelected executive vice-president.

Fiscal Reports Show Earnings Remain Low

A MIXED trend in prices, "with a slight downward tendency," was foreseen by Clarence Francis, chairman of the General Foods Corp., at the company's annual stockholder meeting. Although net sales and net earnings were higher for the first quarter of 1948 than for the same 1947 period, Mr. Francis declared that a substantial contribution to the fight against inflation had been made by the company's absorption of a far greater proportion of the increase in the price of raw materials.

Net sales for the first quarter were $120,027,500, compared with $96,613,863 for last year's first quarter. Net earnings, after provision for income taxes, were $8,155,176, as against $6,446,075. Mr. Francis declared that the 1947 profit rate of 4.5 percent was too low to permit a sound long range program. He added that new products, developed by the company's own resources and brought to market through its own facilities, were the most important means of future growth for General Foods.

Libby, McNeill & Libby reports earnings of $5,366,394 for the fiscal year ended February 28, as against $4,935,083 for the previous year. Sales were 14 percent higher, amounting to $145,370,616, compared with $127,110,575 in 1946. Pres. Daniel W. Creedon predicted that the overall pack in 1948 should be larger than last year and that costs would "probably be no lower."

In a report to stockholders, The Best Foods, Inc., announced consolidated net profit for the first nine months of the 1947-48 fiscal year of $6,873,095, or $4.58 a share. This compares with net profit of $4,145,452, or $2.76 a share after provision for contingencies of $1,500,000 in the corresponding nine months of the 1946-47 fiscal year. Third quarter net profit for the three months ending March 31, 1948 amounted to $2,403,299, or $1.60 a share.

Pacific Gamble Robinson Co., Seattle, one of the country's largest food wholesalers, reports consolidated net sales of $160,398,447 for the year 1947. This compares with $153,365,278 for 1946. Profits, however, dropped to $2,464,447, compared with $3,103,989 for the previous year.

Nine R&MA Contracts Slated Before July

NINE research projects of interest to food processors are scheduled to be contracted out, in whole or in part, to non-government organizations before June 30, according to E. A. Meyer, administrator of the Research & Marketing Act. These nine are part of a group of 20 projects in all, involving a total expenditure of about $1,200,000, which the R&MA officials hope to activate this year. At least four important contracts have already been let.

The nine projects are as follows:

(1) A project to study use of surplus, damaged, and inferior grades of food and feed grains for industrial alcohol and other industrial products.

(2) Commercial scale testing of the drying of potatoes for feed and other non-food purposes by a process developed by the Bureau of Agricultural & Industrial Chemistry at its Eastern Regional Laboratory.

(3) Commercial scale testing of the production of poultry and other animal feeds from vegetable wastes.

(4) Design, construction and operation of a commercial model of continuous type press for recovery of juice from pears and other fruits.

(5) Conversion of semidrying and nondrying soybean oil into fast drying oil for paints and varnishes.

(6) Design, construction and operation of pilot-plant equipment to

fractionate cereal starches by a process developed by USDA researchers;

(7) Investigation of packaging of fruits and vegetables at producing areas and in terminal markets to determine when and where packaging should be done, how spoilage can be prevented, and quality preserved, value of different kinds of packaging materials and transparent films, different methods of preparing and refrigerating these foods.

(8) Investigation to develop new methods of preparing and processing cooked poultry meat, particularly turkey meat; and development of routine laboratory methods for detecting and handling salmonella organisms in eggs and egg products.

(9) Development of new and revised standards and grading for processed fruits and vegetables and other processed foods.

Funds allotted to the first group of four projects amounted to about $90,000. The funds allotted remaining projects should therefore average more than $50,000 each, based on the $1,200,000 total. Several of the projects are extensive, and they may run for more than a year.

One group of Research & Marketing Act projects recently authorized calls for an allotment of funds to each of 20 states (usually to the State Commissioner of Agriculture) for "improving the distribution and expanding the market outlets for agricultural products."

The funds from R&MA are matched by similar grants for the work by the states themselves. Among the states already involved in this program are: Arkansas, California, Indiana, Illinois, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, North Carolina, New York, Oklahoma, Tennessee, Utah, Vermont, Virginia, West Virginia, and Wisconsin.

Other R&MA projects recently authorized to be carried out by various USDA laboratories include studies in the following fields:

Production and marketing of new sweet potato products.

Solvent removal of oil from cottonseed.

Methods of applying 2,4-D to weeds without damage to susceptible crops in nearby fields.

New uses for honey and other apiary products.

New methods of grading, packaging, and shipping to maintain the quality of potatoes and determine their acceptance by the consumer.

New standards for fruit and vegetable containers for which no federal standards now exist.

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If you want to maintain a high degree of sanitation in your plant, don't overlook *Wyandotte Steri-Chlor**, the all-purpose germicide and deodorant.

Steri-Chlor is stable in dry form and does not deteriorate nor lose its strength. It can be used in solution at high temperatures as well as low, without loss of effectiveness. It is not corrosive to equipment and imparts no taste or odor to foodstuffs.

Furthermore, Steri-Chlor is easily, quickly prepared for use. It gives a clear solution, free of sediment, in hard or soft water.

The use of Steri-Chlor with powdered soap as a germicidal hand rinse is highly recommended wherever foods and beverages are handled, processed or dispensed.

This and other products in the Wyandotte line of specialized cleaning compounds can help you increase cleaning efficiency and reduce cleaning costs. Why not ask your nearest Wyandotte Representative for complete information? He's always at your service and ready to help.

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The *efficient* way to keep your mill machinery clean and insect-free at all times is to apply ACRYLON* Spot Fumigant at regular intervals. For ACRYLON is highly toxic to all insects—yet it is so volatile that it leaves no residue to clog machinery or affect food products in any way.

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DEVELOPMENTS IN DISTRIBUTION

Meat Supply Continues Despite CIO Strike

MEAT PACKERS learned, last month, that their maintenance of production in the face of the CIO strike was causing astonishment among the uninitiated. The answer lay in (1) an explanation of the packers' normal method of operation, (2) decline in meat animals coming to market, and (3) falling off in consumer demand.

The packers saw nothing unusual because they have always been geared to handle heavy runs of animals during the peak seasons, yet operate with relative efficiency during slack periods. Number of hours worked is the factor here.

When labor is plentiful, expansion of production is achieved by putting on extra shifts. Since the war, however, and particularly during the strike period, there has not been enough labor to operate more than one shift. So the available labor has to be held on the job until all the animals bought have been disposed of. There has also been some stepping up in the number of animals killed per hour, but the overall effect has been slight.

The 85 to 90 percent normal meat supply maintained during most of the strike period can be misleading. Complicating the picture was the definite decline in consumer demand since before Easter, and there was also a seasonal decrease in the number of animals being sold.

In the final analysis market demand is the chief factor in meat output and in meat prices, strike or no strike. This explains the failure of meat prices to rise during the first two months of the strike.

No Increases Foreseen In Packaging Prices

PACKAGING materials were looked upon as catching up with demand, at the 17th annual packaging conference and exposition of the American Management Assn., in Cleveland, late in April. As a result no important price increases are to be expected during the next few months.

In fact, an industry-wide emphasis on price reduction was apparent. The ball was actually started rolling in this direction by Dow Chemical Co's announcement of a 25 percent cut in plastic film prices.

In discussing price reduction through lowered costs, Lee R. Forker, Quaker State Oil Refinery Corp., suggested that more attention be given to quality control and also to higher speeds of filling and handling. These lower costs are particularly important, since packaging materials have increased from 30 to 150 percent in cost since 1940. Forker expected an easier supply for practically all types of food containers, particularly tin cans, glass containers, folding cartons, paper bags, tubes and drums.

Purchase of packaging materials from carefully drawn specifications was urged by H. F. Coleman, Rexall Drug Co. A surprising number of companies, he said, have no knowledge of the many parts that go into their packages. The result is utter dependence upon the experience and ingenuity of the supplier.

Concerning prepackaging of fresh fruits and vegetables, problems that remain for research were discussed by C. W. Hauck, Ohio State University. One primary problem, not yet resolved, is the extent to which returns will pay the added cost. Professor Hauck said the solution to this and other questions would require a broad research program, which should be included in the Research & Marketing Act program in order to be properly financed and staffed.

Improvement in export packaging was urged by W. H. Husted, Isthmian Steamship Co. If this country will not deliver the goods intact to our foreign customers, he cautioned, the time will come when some foreign exporter will do the job and get the business.

Measures being taken to cut down damages in transit were revealed by A. L. Green, Assn. of American Railroads. Draft gear and springs for cars are being improved, he said, and so are tracks and roadbeds. More mechanized handling equipment is being provided at stations, and employees are being educated in better handling methods.

Dairy Branch Aid

E. M. NORTON has been appointed assistant director of the dairy branch of the Production & Marketing Administration of USDA.

He will be responsible for coordinating and supervising the purchase and sales division, inspection and grading division, and market news division of the dairy branch.

Mr. Norton has had 13 yr. experience with USDA. He bossed dairy and poultry procurement for the former Office of Supply in 1940-41.

New Bill Gives F&DA Wider Food Control

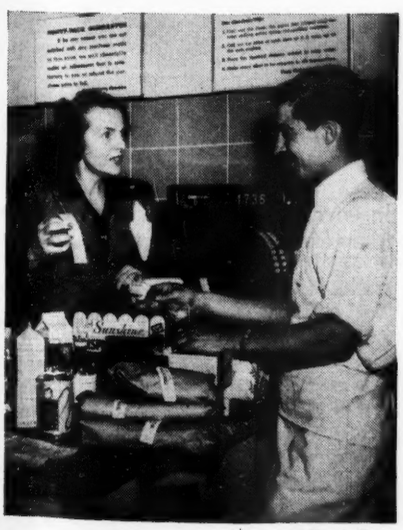
THE AUTHORITY of the Food & Drug Administration, which was broken down by adverse court decisions, will be strengthened again with the probable passage this session of the Miller Bill. Early in May it had already passed the House and was favorably reported out to the Senate by its interstate commerce committee.

The Miller Bill would restore Food & Drug's authority to seize foods or drugs that have become adulterated while the article is held for sale (whether or not it is the first, second or any subsequent sale) after shipment in interstate commerce.

The Supreme Court has already upheld Food & Drug's authority to seize drugs mislabeled, or unlabeled, even though seizure came after the first sale had been made following shipment in interstate commerce. However, it refused to hear another case involving foods that had become adulterated following their first sale after shipment in interstate commerce.

Diesel Refrigeration Tested for Rail Cars

FORECASTING an annual saving of around $50,000,000 from food spoilage in transit, the U.S. Thermo Control Co., Minneapolis, has developed a Diesel-driven refrigerating unit for rail service. This is now undergoing a 6-months' test in operation on important trunk lines. It utilizes the general features of the truck and trailer type units developed by the



Harris-Ewing

HCL MEETS OPPOSITION

Rep. Helen Gahagan Douglas needed some evidence for a speech to the House on the high cost of living. So she went around the corner and got some first hand information along with the day's groceries.

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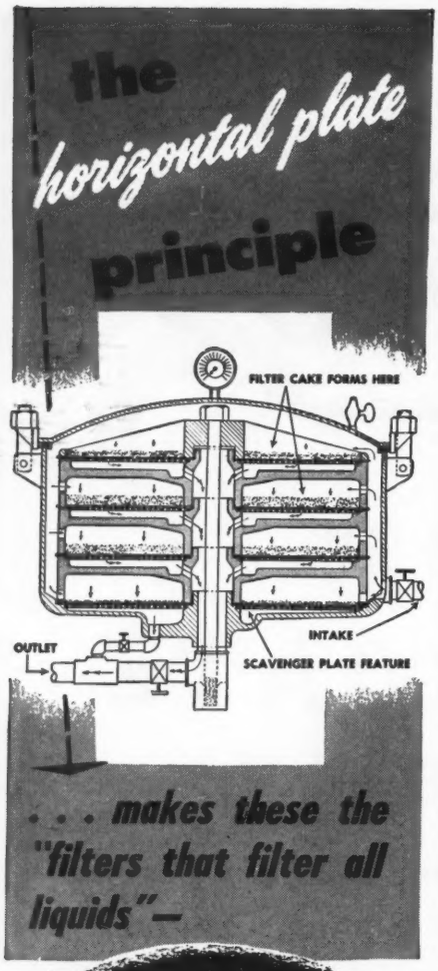
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company, but uses oil fuel instead of gasoline.

For rail car service this indicates a departure from time-honored ice refrigeration and achievement of maximum flexibility of control. Fruits and other foods of different kinds and transit temperature needs can be carried in separate compartments with individual controls. It is estimated that there are now about 5,000 mechanically refrigerated trucks and trailers in service in the U.S.

The new units have been developed from the company's equipment marketed under the "Thermo-King" trade name. There are some 150,000 rail cars in use in this country today in refrigeration service. Climatic variations will have no effect on the food in transit under the new arrangements. As with the truck and trailer types of unit, the new equipment will function on the convection system, with recirculation of cooled air from the evaporator of the unit to the roof and back to the unit again.

The expected savings from spoilage should greatly increase the total tonnage of food available for both domestic and foreign consumption. Savings should also be reflected in lower prices to the consumer, according to a statement by Pres. Joseph A. Numero of the company to a representative of FOOD INDUSTRIES.

Iowa State Develops Food Research Lab

WITH the housing of a new food processing research laboratory, more than five years of development have been brought to a successful conclusion at Iowa State College, Ames.

A 30 x 100 ft., two-story barracks building is being utilized. The first floor will be devoted to food processing, rebuilt and equipped as freezing and canning pilot plants. The second floor is to be equipped and used as an analytical laboratory. This floor will also have a specially constructed instrument room, office conference rooms and classrooms.

Cooperation with the food industry in the study of practical food problems will be one of the laboratory's most important activities. It is being set up as part of the Horticulture Department, which is headed by Dr. E. S. Haber. Dr. Robert G. Tischer, formerly with Owens-Illinois Glass Co., and John Inglis, Frozen Foods, Cal., are in charge of the laboratory.

Beverage Award

NOMINATIONS for the soft drink industry's annual $1,000 Chesterman Award will close August 1.

The award is given to the person or persons judged to have made the greatest scientific or technical contribution to the progress of the soft drink industry in the current year.

THE PROCESSING PICTURE

New Grade Standards Issued by Agriculture

CANNED white potatoes will be covered by new grade standards soon. Frozen strawberries, already covered by U. S. grade standards, have been the subject of an amendment recently. Fresh plums and prunes, also standardized for some time, were the subject of another grade standard amendment.

Frozen strawberry grades now include grades for manufacturing purposes, as a result of industry comments on the proposed amendments, published a year ago. Clarification of the handling of defects in frozen strawberries, to make determination of defects more objective, has also been attempted in the intervening year. The amended standards, published in full and effective May 15, will be found in the April 15 *Federal Register,* beginning on page 2011.

Grades of canned white potatoes are based on the definitions and standards of identity for canned vegetables as promulgated by the Food & Drug Administration. Five styles of canned white potatoes are suggested: Whole, sliced, diced, shoestring (including French style and julienne), and pieces (including orange cuts, quarters, and irregular sizes and shapes, or mixtures).

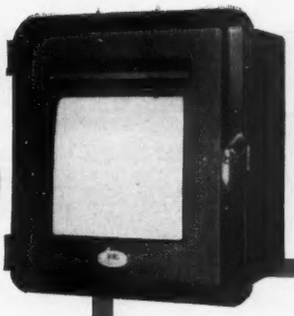
Standards Proposed For Cucumber Pickles

CUCUMBER pickles are to be covered by U.S. grade standards, proposed by Production & Marketing Administration of the U.S. Department of Agriculture. The proposed standards were printed in the March 26 *Federal Register,* beginning on page 1608, and written data, views, or arguments were invited to be submitted until April 25.

Five styles are proposed: "Whole," "cross cut," "slices," "cut," and "finely cut." Six types are mentioned,

A NEW BECKMAN INSTRUMENT . . .

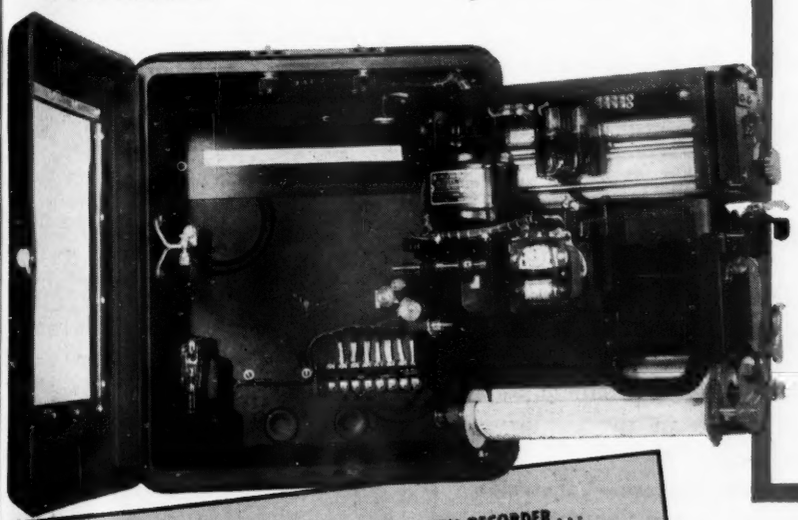
The Photopen RECORDER

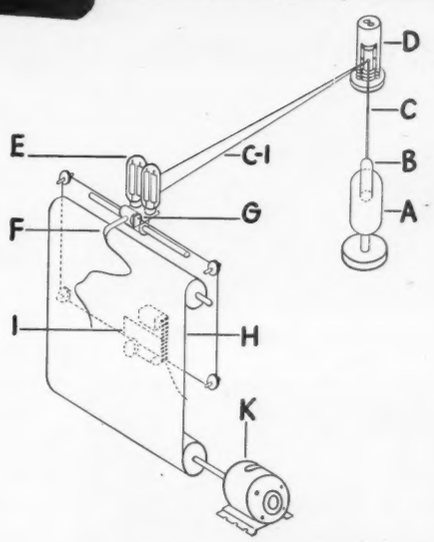


A Unique High-Speed Light Beam Recorder Based on Original Pompeo-Penther Design*

The Photopen Recorder is an important advancement which provides direct high-speed pen recording of light beam deflections. A light beam entering through a slit in the back of the recorder case strikes a unitized photocell-pen assembly. As the light beam moves, the photocell-pen assembly shows the movement, producing an accurate ink trace of the positions of the light beam. As little as 0.1 mm deflection causes a corresponding movement of the pen on the strip chart.

The Photopen offers many advantages, including high sensitivity, fast response, and unusual convenience for a variety of applications in which the position of a moving light beam is to be recorded.





OPERATING PRINCIPLE OF THE BECKMAN PHOTOPEN RECORDER

The basic operating principle of the Beckman Photopen Recorder is shown in the schematic drawing above. A light beam (c) projected from the light source (a) through the lens (b) to the galvanometer mirror (d) is deflected from the mirror through a slot in the back of the Recorder case where it strikes twin photo-tubes (e) and through an amplifier controls and operates the reversible motor (i). When the deflected beam (c-1) deflects to the left photo-tube cathode, the pen carriage (g), mounting both the photo-tubes and recording pen (f), moves to the left. When the beam deflects to the right photo-tube cathode, the pen carriage assembly moves to the right. When the beam (c-1) is centered between the cathodes, the pen carriage assembly remains stationary. Recording chart (h) is turned at a uniform rate of speed by the drive motor (k) throughout the entire operation, thus permanently recording beam fluctuations.

UNIQUE FEATURES OF THE BECKMAN PHOTOPEN RECORDER . . .

EXTREME SENSITIVITY. The Photopen Recorder requires only a weak intensity light beam for completely satisfactory operation, and deflections as small as 0.1 mm are instantly detected and recorded.

HIGH RESPONSE SPEED. The Photopen Recorder provides extremely high response speeds — as fast as 1½ seconds across the chart — with no "hunting" or oscillation of the pen.

CONTINUOUS RECORD. The Photopen Recorder records every movement of a galvanometer or other type mirror instantly, accurately and continuously.

VISIBLE RECORDING. The record obtained with a Photopen Recorder is immediately visible throughout the progress of an experiment — with none of the delay or inconveniences encountered in photographic development processes.

MAXIMUM CONVENIENCE. The Photopen Recorder can be operated in any laboratory, and requires no special facilities or mounting provisions. Ordinary room illumination does not interfere in most cases.

**D. J. Pompeo and C. J. Penther, Rev. Sci. Inst., 13, 218, (1942).*

THERE ARE MANY VALUABLE APPLICATIONS FOR THE PHOTOPEN RECORDER

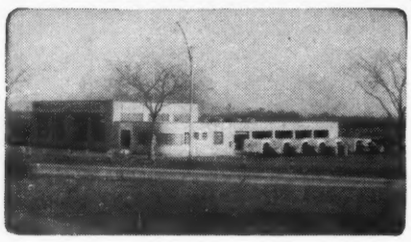
The Photopen answers the need for a highly sensitive, convenient recorder for such applications as determining differential temperatures between opposing thermocouples such as in thermal analysis work . . . recording current-voltage curves in polarographic analyses . . . recording ion currents in mass spectrographic work . . . recording galvanometer deflections in infra-red spectrophotometry . . . recording deflection of torsion balances, including film balances as used in determining surface tensions . . . recording deflections from strain gauges for measuring beam deflections . . . recording progress and results of tests run on certain types of profilometers . . . recording mirror deflections in radiometers and certain types of microphotometers.

The Photopen Recorder is another in the extensive line of Beckman Instruments for modern research and industrial control operations. Write for full details. *Beckman Instruments, National Technical Laboratories, South Pasadena 18, California.*

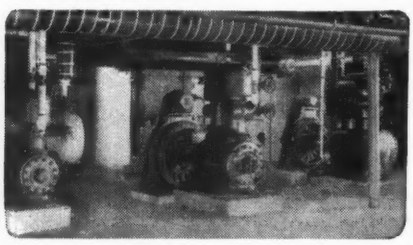
BECKMAN INSTRUMENTS CONTROL MODERN INDUSTRIES

pH Meters and Electrodes — Spectrophotometers — Radiation Meters — Special Analytical Instruments

Costa's Ice Cream Plants—Old and New—Both Equipped with



Costa's New Plant Along U. S. 1 is Supermodern, Super-efficient.



Three Frick Ammonia Compressors Give Dependable Refrigeration.

FRICK TRADE MARK

Refrigeration

Twenty-two years ago, Costa's Ice Cream Co. began using Frick Refrigeration in a small plant at Metuchen, N. J. The business prospered.

Today Frick Equipment carries the entire cooling load at the Company's magnificent new plant, one of the finest in existence, adjoining U. S. Highway No. 1 at Woodbridge, New Jersey.

Frick Refrigeration is helping thousands of businesses to grow. Perhaps you, too, could be using it?

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Frankly, we *don't* know all the answers when it comes to enzymes in food. But we *do* have ideas about enzymes and how they can help you develop better processes, better products, and better yields in the following industries:

Enzymes...

A WAY TO IMPROVED FOOD PRODUCTS

Meat—Milk—Cheese—Vegetables—Fruit Juices and Concentrates—Wines—Milling (flour, cereal, baking)—Distilling—Brewing—Chocolate

. . . and we'll be happy to suggest possible ways and means of solving your specific problem.

For example, Starches can be solubilized or converted to sugars in peas, corn, wheat and other grains. Proteins can be modified or hydrolyzed in meat, animal intestines, lactalbumin, or legumes. Pectins can be hydrolyzed in wines, fruits, fruit juices or concentrates.

Let us help you find the right answer. Write or phone:

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Special Products Department

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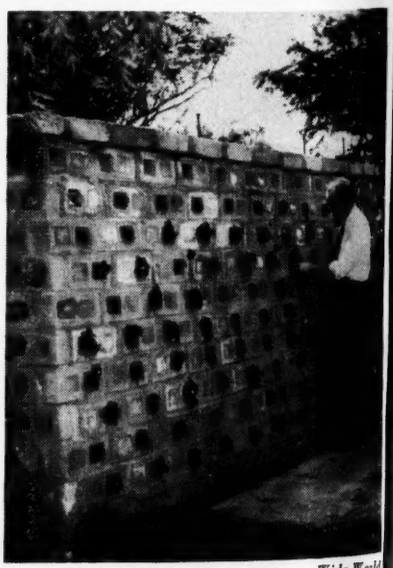
although the type is not a factor of quality for the purpose of these grades. Types mentioned include "dills," "sour," "sweet," "mixed," "chow chow," and "sweet pickle relish." Proportions of the usual ingredients are indicated.

Meat Inspection Costs Again Loom for USDA

As the result of demands from the meat packers, a non-committal attitude by the administration, and smart legislative maneuvering, it appeared at the beginning of May that the expenses of federal meat inspection might once again be paid by the government.

A bill that would end the fee system, by which the packers now pay the cost of inspection, had passed the Senate and seemed due for approval by the House. But it remained a question whether or not the powerful agriculture subcommittee of the House appropriations committee would vote funds to the Department of Agriculture for the purpose of paying for inspection. Without the appropriation, the passage of the law would not, of itself, accomplish what its backers hope.

The appropriation bill, which the House approved and sent to the Senate, carried no funds for meat inspection. Hence, backers of government-paid meat inspection were hoping that House passage of their bill, if forthcoming, would help Sen-



Wide World

STRAWBERRY PATCH

Parallel walls of hollow cement blocks provide this vertical strawberry patch for Henry Hayward, San Fernando, Cal. The plants are set into the hollow sections with their roots in soil that fills space between walls. The patch holds 350 plants, is 13 ft. long, 6 ft. high, and 32 in. wide.

you win

Every day, more and more flavoring manufacturers are moving into a winning sales position with Ethavan (Monsanto's Ethyl Vanillin).

The distinctive flavor, pronounced aroma and staying power of Ethavan add extra taste appeal to bakery products, candy, ice cream, beverages and other foods in which an aromatic, vanilla-like flavor is desirable. These qualities, plus Ethavan's economy (it's three times stronger than ordinary vanillin), make a sure-to-win combination for flavor manufacturers and processors.

In addition to Ethavan, Monsanto offers Coumarin Monsanto, Methyl Salicylate Monsanto, U.S.P., (Synthetic Oil of Wintergreen) and Vanillin Monsanto, U.S.P., for improved taste and sales appeal in food flavorings. Complete information and samples may be obtained by writing MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. If you prefer, contact any District Sales Office or return the convenient coupon.

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DISTRICT SALES OFFICES: New York, Chicago, Philadelphia, Boston, Cleveland, Cincinnati, Detroit, Charlotte, Birmingham, Houston, Los Angeles, San Francisco, Seattle. In Canada: Monsanto (Canada) Ltd., Montreal.

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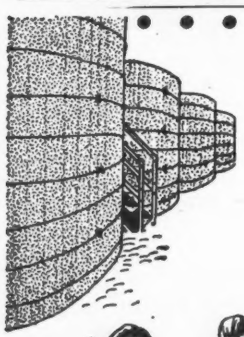
FAN-TYPE FOR FLAT SLICING SPRAY



FOOD PROCESSING EQUIPMENT *A Problem?*

Tidewater
RED CYPRESS

IS YOUR ANSWER!

A PROVEN FACT: Tidewater Red Cypress does not impart odor, taste, or discoloration to food with which it is brought into contact. This fact alone makes it ideal for such items as fermenting vats, processing tables, churns, pickle containers, etc.

A PLUS VALUE: This outstanding wood also offers extraordinary resistance to deterioration when used under adverse conditions such as extreme dampness, heat, etc.

The Water Red Cypress "The Wood Eternal"

LET US HELP YOU. WE INVITE INQUIRIES CONCERNING ALL TYPES OF TANKS AND VATS – FULLY FABRICATED OR PARTIALLY FABRICATED

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ate proponents in getting an appropriation into the bill and through the Senate. Then it would be a case of making the appropriations stick in the House-Senate conference committee, which has the job of ironing out the differences in the two bills.

Firmly opposed to the government's supporting the cost of meat inspection is Congressman Everett M. Dirksen (R., Ill.), chairman of the agriculture subcommittee of the House appropriations committee. It was he who was responsible last year for having the funds knocked out of the agriculture appropriations bill.

In the last year for which the government paid for federal meat inspection, the cost totalled about $11,000,000. It is now estimated that because of higher costs and increased demand for the service, the charges may run as high as $13,000,000 annually.

Year-Old Frozen Eggs Remain Fresh at LSU

A METHOD for keeping eggs fresh tasting, even after they have been frozen for more than a year, has been developed by Dr. Socrates Kalayereas, food technologist of the department of agricultural chemistry and biochemistry, Louisiana State University experiment station.

According to Dr. Kaloyereas, the significant fact of his invention is that the egg embryo survives the freezing process and the "hatchability" is not destroyed.

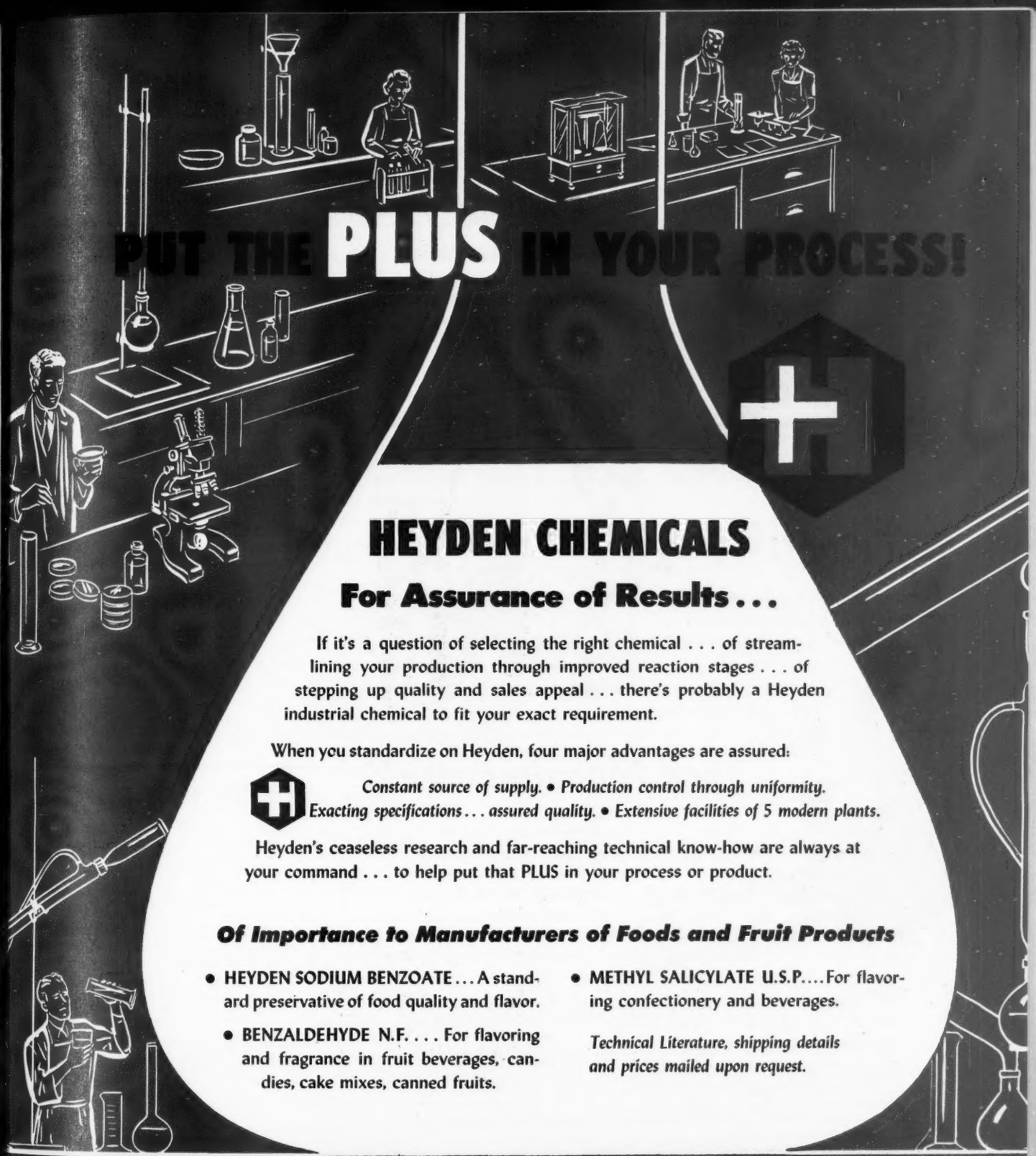
The method is to treat the eggs to provide space for the expansion of water in freezing and to reduce to a minimum the expansion of the ice. The eggs are processed for about a half hour in a vacuum desiccator with a dehydrating agent. They are then placed in a freezer room held between 15 to 20 deg. F. The contents attain a semi-solid state, the shell remaining whole, and the eggs keep indefinitely at sub-freezing temperature.

Dr. Kaloyereas began his experiments more than a year ago.

Nutrition Grants

TRUSTEES of the Nutrition Foundation have authorized granting of $121,917 to 15 U. S. and Canadian universities for research on vitamins, amino acids, sugars, fats, and trace elements.

Dr. C. G. King, scientific director of the foundation, said of the grants: "These projects represent an investment based upon the faith of food manufacturers in well-trained manpower and in the value of basic research.



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- **HEYDEN SODIUM BENZOATE** . . . A standard preservative of food quality and flavor.
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- **METHYL SALICYLATE U.S.P.** . . . For flavoring confectionery and beverages.

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Florist?

Among biggest Air Express users are retail and wholesale florists. They've found *speed pays.*

Food Manufacturer?

This industry gets machinery replacement parts and supplies regularly by Air Express. In this business, *speed pays.*

Speed pays in your business, too!

And you can't beat Air Express for speed. It's the *world's fastest* shipping service. Goes on all flights of Scheduled Airlines. Door-to-door service, no extra cost. Low rates: 28 lbs. goes 500 miles for $4.30, 10 lbs. for $1.98. Phone local Air Express Division, Railway Express Agency, for fast shipping action.

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Southern Bakers Elect Cline at Miami Beach

E. P. CLINE, chairman of Colonial Baking Co., Columbus, Ga., was re-elected president of the Southern Bakers' Assn. at the annual convention held in Miami Beach, Fla.

Other officers re-elected included William J. Colby, of Ambrosia Cake Co., Birmingham, Ala., vice-president and chairman of the board; and Faber A. Bollinger, secretary-treasurer.

More than 500 delegates to the convention heard discussions relating to methods of sales and the use of radio, billboards and newspapers as advertising media. It was agreed that the three most important activities which the industry must emphasize are quality merchandise, attractive and sanitary packaging, and a good job of merchandising.

The association plans a Southern Bakers Exposition & Production Clinic to be held at the Municipal Auditorium, Atlanta, Ga., September 19-21. This will be the first in the South, as well as the first to be held in the country in the past several years. The American Institute of Baking will direct the production clinic.

SCHEDULE OF EVENTS

June

2- 4—Mayonnaise & Salad Dressing Manufacturers Assn., annual convention, Haddon Hall, Atlantic City, N. J.
2- 5—Refrigeration Research Foundation, northeast fruit storage training course, Hotel Seneca, Rochester, N. Y.
6- 9—Institute of Food Technologists, 8th annual convention, Benjamin Franklin Hotel, Philadelphia, Pa.
10-11—Waxed Paper Institute, summer meeting, The Homestead, Hot Springs, Va.
14-16—The Bakers' Assn. of the Carolinas, summer convention, Ocean Forest Hotel, Myrtle Beach, S. C.
14-16—American Dairy Science Assn., 43rd annual meeting, University of Georgia, Athens, Ga.
20-25—National Confectioners Assn., 65th annual convention and 22nd confectionery industries exposition, Waldorf Astoria, New York City.

July

12-18—Food & Agricultural Industries, 7th annual international congress, Paris, France.

August

9-12—International Apple Assn., 54th annual convention, Hotel Pennsylvania, New York City.
10-13—Western Packaging Exposition and Conference on Packaging, Packing, & Shipping, Civic Auditorium, San Francisco.
9-20—Gordon Research Conferences, Colby Junior College, New London, N. H. (9-13 Vitamin and Nutrition; 16-20 Food and Nutrition).

September

13-15—American Soybean Assn., 28th annual convention, Hotel Peabody, Memphis, Tenn.
13-17—Instrument Society of America, National conference and exhibit, Convention Hall, Philadelphia.
20-22—American Meat Institute, annual convention, Waldorf Astoria, New York City.
27-Oct. 1—Newspaper Food Editors' Conference, Waldorf Astoria, New York.

Changes in Food Supplies

(Indicators)

Production

Creamery butter production in March was estimated at 89,820,000 lb., a seasonal gain of 17 percent from February. Production, nevertheless, was 20 percent under March, 1947 and 23 percent below the five-year average for the month.

American cheese output for March was estimated at 59,265,000 lb. While this is a seasonal increase of 27 percent over February, it is 24 percent less than the March, 1947, production. The total, however, was only 5 percent under the 1942-46 average.

Ice Cream production in March totaled 45,490,000 gal., 2 percent more than March of last year, and 42 percent more than the five-year-average for the month. This was the first month since December, 1946, that production exceeded the corresponding month a year earlier.

Wheat flour production for February, estimated at 21,000,000 sacks, represented a 13 percent drop from the 24,200,000 sacks produced in January. It was also 15 percent les than the February, 1947, output.

Lard production in March was down to 125,099,000 lb., from the revised February total of 159,513,000 lb.

Liquid egg production, in March totaled 70,349,000 lb., which compares with 93,903,000 lb. turned out during March, 1947.

Dried eggs produced in March were down to 1,781,000 lb., compared with 11,248,000 lb. in March a year ago.

Frozen egg production totaled 63,019,000 lb. in March, an increase over the 57,290,000 lb. produced in March, 1947.

Materials

Tomatoes for processing will be down about 10 percent, according to early estimates of planting intentions. Total acreage is indicated at around 472,680 acres, compared with 523,830 acres planted in 1947, and the immediate ten-year average of 515,030 acres.

Sweet corn for processing shows a slight increase in acres planted. Early plans called for about 551,200, as against 544,400 acres planted last year, and an average of 453,900 for the past ten years.

Snap beans for processing show an indicated reduction of about 3 percent. Only 105,880 acres are estimated, which compares with 109,430 acres planted last year, and 110,540 for the ten-year average.

Cabbage for kraut shows a 60 percent increase over last year in early estimates. Planting intentions indicated a total of 7,270 acres, as against 4,540 in 1947. The ten-year average, however, was 10,420 acres.

Beets for canning will be increased by about 28 percent, if early planting plans are carried out. Acreage will total 12,700, compared with 1947 plantings of 9,950. The ten-year average was 16,210.

Storage

Frozen fish and shellfish held in storage April 1 totaled 77,070,841 lb., compared with 78,241,550 held on April 1, 1947.

Cooler occupancy dropped 7 points during March, reaching 58 percent on April 1. Occupancy normally increases about 2 percent during this period. Cooler occupancy was also 3 points below 1947 levels.

Freezer occupancy showed a 6 point drop in March, the April 1 figure being 75 percent filled. This was about double the normal March decline, while occupancy was about 5 points below 1947.

Indexes

The commodity price index on food, compiled by the New York Journal of Commerce was 201.3 for the week ending May 8, 199.2 for the preceding week. 199.3 for April and 193.5 for May, 1947.

Business Week's index of business activity jumped to 189.0 for the week ending May 1, compared with 186.2 for the preceeding week, 181.1 the month before, and 191.3 a year ago.

CONSTRUCTION NEWS

	Pending (thousands)	Total Awarded — May (thousands)	Total Awarded — 1948 (thousands)
Bakery	$ 193	$4,800	$ 5,585
Beverages	715	.....	8,781
Canning and Preserving	.....	.....	320
Cold Storage	.....	.....	336
Confectionery	825	1,028	1,253
Grain Mill Products	1,200	.....	4,960
Ice, Manufactured	.....	.....	.....
Meats and Meat Products	126	.....	751
Milk Products	200	.....	2,654
Miscellaneous	300	.....	5,507
	$3,559	$5,828	$30,147

FERRY CONTINUOUS POTATO CHIP MACHINE

is completely automatic! Automatic from raw, unpeeled potatoes to finished product. Peeling, slicing, washing, drying, frying and salting . . . all are under perfect control. You can't beat a Ferry Potato Chip Machine.

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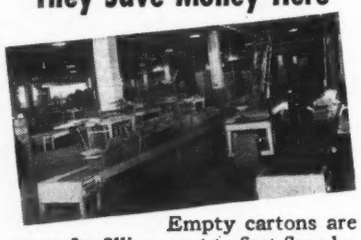
CONVEYORS

Assures a faster straight line movement from raw materials . . . to packaged products . . . to shipping room. Cut materials-handling costs, save floor space, speed up production.

They Save Money Here



Empty cartons are set up for filling, sent to first floor by Lamson Belts and Boosters.

They Save Money Here

Basement boosters (at left) are discharging empty cartons to a horizontal filling belt on first floor.

They Save Money Here

Floor belt conveyors deliver cartons to filling stations . . . then to closing and wrapping machines.

Lamson Pneumatic Message Tubes—supplement conveyors to coordinate control of papers, materials and products.

Lamson—(Allen Billmyre) Blowers, Exhausters and Vacuum Cleaning Systems—are available for processing, conveying, cooling and for every cleaning requirement.

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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

MONOPOLY EXEMPTION — Bakers were asked to agree with the Department of Agriculture and with each other to stop consignment bread selling as a measure of grain conservation. This is the substance of the voluntary industry plan worked out by the Department, with a May 1 effective date. Actually the important thing for the industry was the promise under this law that bakers will not be prosecuted for collusion in restraint of trade if they thus embarked on a joint agreement.

One doubts whether all consignment selling will be permanently ended, but a step toward that sound objective is being taken. Incidentally this gives food technologists a better chance to put further into practical application the use of anti-staling components in bread. They will certainly be more needed wherever reduced consignment selling results in retention at the retail store a bit longer than normal.

DIET HABIT—A national survey of home consumption of food is to be made by the Bureau of Human Nutrition and Home Economics of the U. S. Department of Agriculture. Thus there should be made available a more accurate summary of the buying habits of homemakers. If the 70 cities studied prove, as is confidently expected, to be typical of the United States, then we shall know many more facts on which to base food marketing programs. A small sample trial has been made in a few places during the past winter. Thus a pattern for the study is ready for the 70 cities now being surveyed. Funds for the job have come from the Research and Marketing appropriations.

HOME CONSERVATION — Housewives are asked to join the food conservation program for the benefit of European Relief. Meatless Tuesdays, of bad repute, have been abandoned. Newest Department of Agriculture effort is distribution of "Money-Saving Main Dishes"—a little leaflet "to suggest practical ways in which homemakers can cooperate". Here's hoping that they cooperate better than they did on the eggless Thursdays. Thin pocket books may encourage cooperation.

WHO DID IT? — Labor efficiency in food-raw-material production is now one and a half times as great as at the end of World War I, measured in output per man year. Most benefit has come from technologic improvements, better seed, better agronomy, and, most of all, labor-saving machinery and labor-saving fertilizer. The food industries have not yet got their slice of the benefit, for they do not get their raw materials from the farmer at a lesser cost proportionate to the lesser expense of production. We wonder if they ever will.

CONTROLS LACKING—Many crops are not as good either in quantity or quality as they might be. Often suspected is a deficiency in some minor soil component. The fertilizer folks say that they could supply (along with major nitrogen, phosphate, and potash) any of the minor micro-nutrients, if they only knew which ones were really needed. Basic difficulty appears to be a lack of chemical methods precise enough to identify shortage in the land of some essential minor element. Food processors dependent on better crops for better factory operation will have to look into this matter of analytical and control methods.

MORE HOUSEWIVES — Cottonseed and soybean interests organized in the House of Representatives the campaign for repeal of margarine taxes. Only their vigorous effort made any progress possible while the Agriculture Committee, dominated by dairy states, held up such legislation. But the cottonseed and soybean interests succeeded in blasting the legislation loose only because there are more housewives who vote than dairy farmers. This again illustrates one impor-

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tant fact of Washington: One needs an organized political bloc to get anywhere; but the backing of large numbers of independent voters generally influences the ultimate decision most of all.

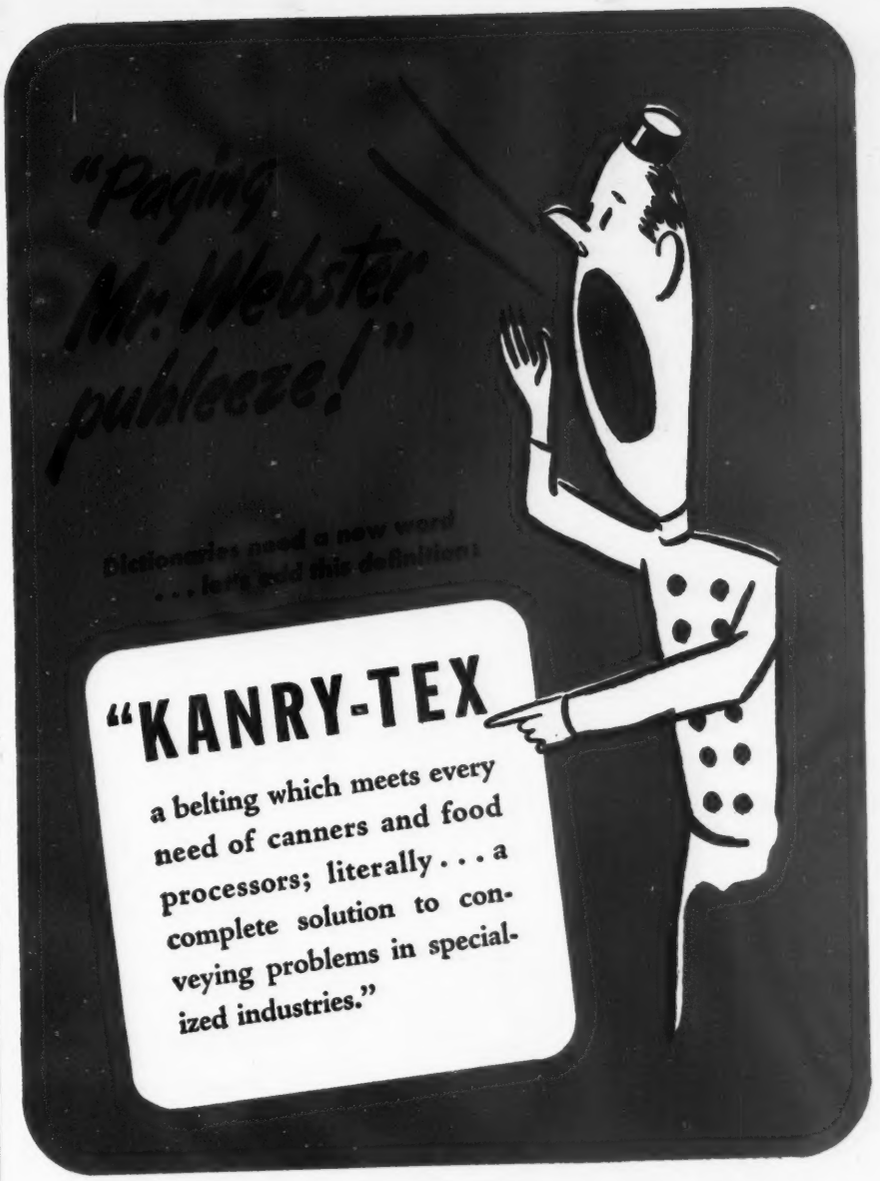
"FRUITLESS" — A keen Washington interpretation of the grain conservation program of the Department of Agriculture was headlined late in April thus: "Industry Grain-Cut Plan Nears End, Fruitless After Four Months". This tells most of the story. The department's best efforts have not found any basis on which an organized food-plant program for grain saving can be based. Incidentally, it looks as though reduction of animal feeding with grain is going to do all that is necessary.

MODERNIZATION — Food factory operators long waiting for equipment delivery and for new plants, may soon need a new yardstick. It looks as though labor scarcity might become a dominant factor in Washington thinking. If it does, Uncle Sam may take a hand next winter in establishing some sort of a priority scheme on equipment and industrial construction. That sounds like wartime control, which makes it sound much like the rest of Washington today.

All this means that each management seeking equipment and construction may need to get ready with evidence that labor saving in the factory operation more than offsets the labor requirement for building and installation. It will be smart to be ready to make such a comparison accurately, should this unfortunate combination of circumstances actually develop. Naturally, everyone hopes that such extreme of war-like conditions will not develop. But hoping so offers little protection if bad comes to worse.

INDUSTRIAL CROPS — Department of Agriculture officials are trying to guide farmers into production of crops for industrial markets, that is for food-plant processing. Incidentally, the department runs four of its major regional laboratories for the prime purpose of finding out how to process such crops with greater profit to both farmer and factory owner. The department is constantly seeking means for improving the partnership between these two groups having a common purpose.

PREPAREDNESS—Military spending will soon monopolize much factory activity. Conditions during World War II will be remembered by all clearly enough to indicate what this means for the food factory that wants equipment and spare parts. The stockroom of every plant should, therefore, lay in a good supply of spares now. There is a big if—whether one can get them even now. But it will not hurt to try before the military activity makes it difficult or even impossible.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INDUSTRY

Archer-Daniels-Midland Co. is having a large soybean extraction plant added to its facilities at Decatur, Ill. Blaw-Knox Co. has been given contract for designing, erecting and supplying equipment for new plant. Completion date is set for early 1949.

Arizona Brewing Co., Phoenix, Ariz., is making an addition to its plant at a cost of $70,000.

B. C. Fruit Processors, Ltd., have purchased plant and equipment of Okanagan Fruit Juices, Ltd., which has been in operation at Kelowna, B. C., for past two years.

The California Packing Corp. is building a new warehouse and office at Vernon, Los Angeles, Cal., at cost of $85,000.

Canada Dry Ginger Ale, Inc., is constructing a new bottling plant in Philadelphia to cost approximately $1,400,000. This will be largest Canada Dry bottling plant in U. S., and it will provide more than three times production capacity of present Philadelphia facilities.

Goebel Brewing Co., Detroit, will erect a new government cellar and a stockhouse addition at its plant No. 3.

General Mills, Inc., Minneapolis, Minn., has appropriated a $3,000 research grant to milling dept. of Kansas State College, Manhattan, Kan. Investigations will be made to determine yearly variations in baking qualities of wheat.

Growers & Packers, Inc., North Collins, N. Y., is completing a new warehouse in connection with its canning factory. An underground passage, equipped with a cooling apparatus, connects two buildings so canned fruits or vegetables can start from factory direct from steam bath and arrive at warehouse cooled and ready to be packaged.

Hawaiian Pineapple Co., Ltd., Honolulu, Hawaii, has acquired business of Barron-Gray Packing Co., San Jose, Cal. Barron-Gray pioneered in development of fruit cocktail, in which pineapple tidbits are an important ingredient.

Kraft Foods Co. has been issued a building permit for construction of $80,000 plant in Rome, N. Y. It will incorporate facilities of several other Kraft-operated cheese plants in central New York.

PERCY C. MAGNUS

President of Magnus, Mabee & Reynard, Inc., Percy C. Magnus was one of principal speakers at 39th annual convention of Flavoring Extract Manufacturers Assn. of U. S. In his address, he predicted good times for the industry.

DR. CONRAD A. ELVEHJEM

Professor of Biochemistry, University of Wisconsin, Dr. Conrad A. Elvehjem has been elected recipient of 1948 Nicholas Appert Medal Award conferred by Chicago Section of IFT. Presentation will be at Philadelphia meeting of Institute.

Land O'Lakes Creameries, Inc., Minneapolis, Minn., plans a $500,000 construction program for 1948 to include four new plants at Buffalo and Whitehall, Minn., Dresser, Wis., and Valley City, N. D.

Larrowe Mills, Inc., Cohocton, N. Y., one of country's largest buckwheat mills, was destroyed by a fire Mar. 30. Loss was estimated at more than $100,000.

Pabst Brewing Co., Milwaukee, Wis., announced completion of a new three-story, completely air conditioned research building to house enlarged staff of research personnel.

Pontiac Ice Cream Co., Pontiac, Mich., has been incorporated for $200,000 by David Shwedel to manufacture and sell ice cream and dairy products.

S & W Fine Foods Corp. has recently opened a modern warehouse in Bronx, New York City. This is a further step in firm's countrywide expansion. Additional plans call for new buildings in Chicago and Portland, also erection of a new home office in San Francisco.

Thompson Valley Growers Co-operative Exchange, Kamloops, B.C., has purchased packing house and cold storage plant of McGillivray & Co., Kamloops, for an estimated $127,000.

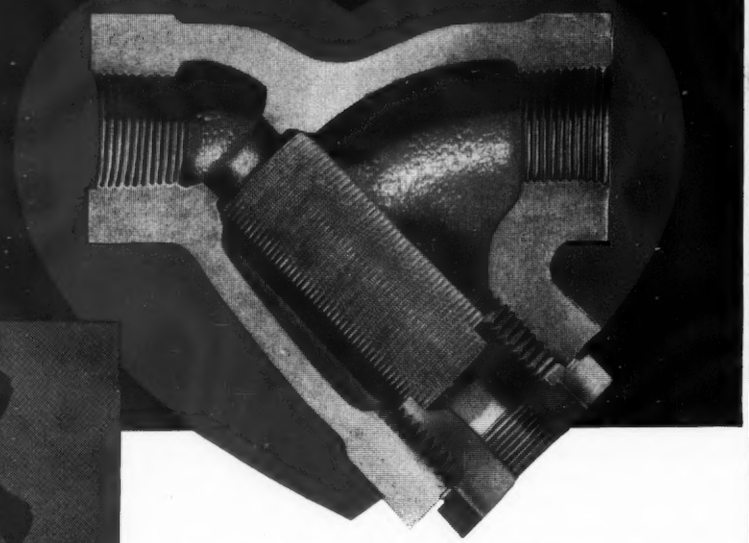
Warfield Co., Chicago, has announced plans for construction of a cocoa and chocolate plant to cost between $500,000 and $750,000 at New Orleans. New plant will provide 80,000 sq. ft. of manufacturing and storage space.

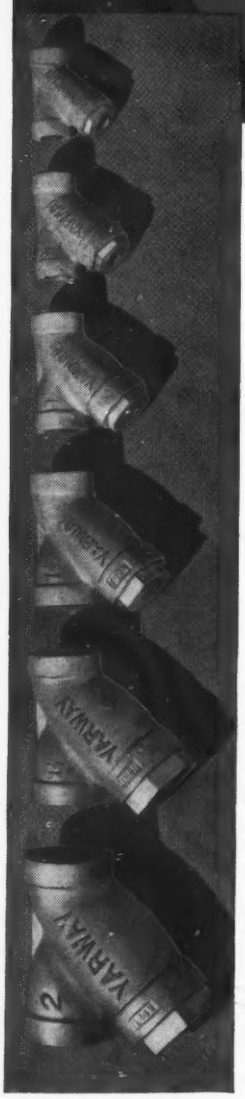
EARL A. BUTTS, Jr.

Newly appointed manager of special bakery department of Armour & Co., Earl A. Butts, Jr. will work closely with bakers in solving production problems and developing improved products.

Lee Wilson & Co. announced start of construction of a $1,250,000 plant at Wilson, Ark., for combined production of margarine and shortening. Plant will be operated by Delpro Corp., a subsidiary of Delta Products Co. Daily capacity will be 8,500 lb. of shortening and 4,500 margarine.

The SCREEN of the YARWAY STRAINER





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PERSONNEL

Harold C. Beach, general manager of Battle Creek, Mich., plant of Weston Biscuit Co. since 1936, has been elected executive vice-president.

Richard Bell-Irving of Anglo-British Packing Co. was elected chairman of Canadian Manufacturers' Assn. at its 31st annual meeting in Hotel Vancouver, Vancouver, B. C. Gerald H. McVean, manager in British Columbia for American Can Co., was elected vice-chairman.

John Brandt, Minneapolis, Minn., has been re-elected president and general manager of Land O'Lakes Creameries, Inc., for 25th time. M. H. Mauritson, Shelby, Minn., was elected 1st vice-president; A. J. Sandness, LaMoure, S. D., 2nd vice-president; and Frank White, Marshall, Minn., secretary.

Burl W. Brant has been named general manager of Zigler Canning Co-operative, Timberville, Va. He will be assisted by Ray McAfee as plant manager.

Frank Buese, formerly production manager of Queen Anne Candy Co., is now factory manager of King Candy Co., Fort Worth, Tex.

J. S. Eckman, formerly vice-president and managing director of Canadian Fishing Co., has now been named president.

J. A. Edington has been appointed sales manager of Booth Fisheries Corp. Formerly West Coast district manager in Seattle, he will now make his headquarters in Chicago.

Collins F. Fuller, processing engineer and packaging consultant in Chicago area, is now chief of Container Analysis Div., Container Laboratories, Quartermaster Food & Container Institute for Armed Forces, Chicago, Illinois.

D. E. Greb has been appointed general manager of Durbrow Bros. Canning Co., Cedar Rapids, Iowa. Company's name formerly was Farmer's Food, Inc. No change in ownership has occurred.

M. Francois de Meneval, Paris representative of Dodge & Olcott, Inc., New York City, and a partner of Bories & de Meneval S.A.R.L., Paris, arrived in New York aboard the S.S. Oregon May 10. M. de Meneval is also vice-president of Syndicate of Essential Oils.

Dr. Aksel G. Olsen, manager of General Food Corp.'s applied research at its Central Laboratories, has been invited to speak before members of Technical Research Councils of Sweden, Norway and Denmark.

Milton E. Parker has been named professor of food technology at Illinois Institute of Technology, Chicago. He will be in charge of expanding program of food technology education and research.

Harry G. Podlesak, executive engineer, has been elected a member of the board of directors Kraft Foods Co. He will head the country-wide program of new plant construction and plant remodeling. A graduate of University of Illinois, he began his career with Link-Belt of Chicago.

Christian Rask, plant manager and chief chemist of Albert Schwill & Co., Chicago malt firm, has been named vice-president in charge of production.

Dr. Irving Sitkoff has been named president of Supreme Shortening Corp., Brooklyn, N. Y. Recently reorganized, company is now adding additional equipment for manufacture of hydrogenated vegetable shortening.

Carl C. Spoto is new president and chairman of board of directors of Brocton Preserving Co., Brocton, N. Y. Plant, which had been destroyed by fire last June, is now about 90 percent re-equipped.

Harold Synnestvedt of Seattle, Wash., was elected president of The New England Fish Co. at directors' meeting held in Chicago in March. He fills vacancy created by death of A. L. Hager of Vancouver, B. C.

Newton P. Steacy has been appointed district manager in British Columbia by Borden Co., Ltd.

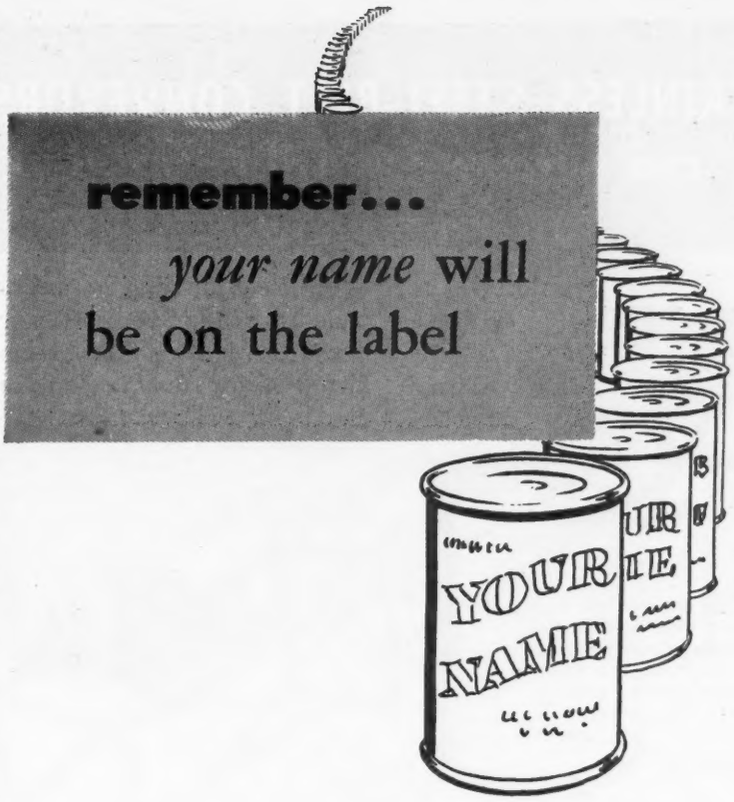
Richard Trelease, formerly in Poultry Research Div., Research Laboratories, Swift & Co., Chicago, has been appointed assistant to vice-president in charge of research. He succeeds George E. Brissey, transferred to special project in Research Laboratories.

Hugh L. Templeton, formerly in charge of research development and supervision for Fairmont Foods Co., Omaha, Neb., has been named technical director.

Harry J. Volbers has been named president of Erie County Milk Assn., Erie, Pa. Since 1937 he has served as manager of organization, a subsidiary of National Dairy Products Corp.

John Ware has been appointed general manager of Holloway Corp., New York, producer and distributor of invert sugar, sugar sirups and molasses.

C. R. Zimmerman, formerly chemist and general manager of Wheeler Barnes Co., Minneapolis, Minn., has formed new firm of Barnes & Zimmerman, Inc., located at Brighton, Minn. Production of preserves, jellies and bakers' products is expected to start June 15.



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SMOOTH, IMPERMEABLE SURFACE—No place for food particles to lodge. No danger of taste contamination. Easy to slide large pieces of meat, on or off.

LONG SERVICE LIFE—The SANDVIK steel belt has inherent high strength and resistance to time and wear.

ENGINEERED TO FIT APPLICATION—Entire unit designed to give maximum efficiency. Wide range of belt widths available. Lengths to meet any center distance. Height of belt from floor can be arranged to give correct working height despite special floor conditions. Painted framework is standard but can be galvanize dipped when required.

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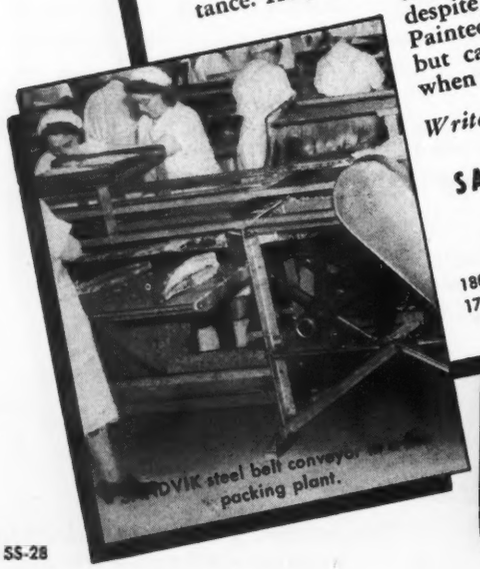

SANDVIK steel belt conveyor . . . packing plant.

SANDVIK STEEL BELT CONVEYORS

SS-28

ASSOCIATED INDUSTRIES

Dairy Industry Supply Assoc., at its 29th annual meeting in Chicago, elected H. E. Olson of Taylor Instrument Co. as incoming president; Wayne D. Jordan of Liquid Carbonic Corp. as incoming vice-president; Ralph I. Young of Sharples Corp. as treasurer; and Robert Everett as executive vice-president.

J. W. Greer Co. of Cambridge, Mass., announced appointment of Curtis B. Hoffman as general sales manager.

St. Regis Paper Co. has established one of country's largest integrated kraft paper operations at its Pensacola plant and is now getting into full production.

F. J. Stokes Machine Co. has appointed F. J. Stokes chairman of board, and elected Francis Dougherty, Jr., to presidency.

Peerless Pump Div., Food Machinery Corp., has assigned D. S. Bentley as sales engineer to Florida territory, with headquarters in Orlando.

Wallace & Tiernan announces appointment of E. A. Heiss as director of food operations, excluding flour mill activities.

Glass Container Manufacturers Institute has appointed Benjamin Wood director of marketing for Institute.

DEATHS

Karl W. Von Allman, vice-president and secretary of Von Allman Preserving Co., Louisville, Ky., Mar. 11.

Lester E. Britton, 61, associated with Consolidated Rendering Co., Boston, and an internationally known authority on soil conservation, at Auburndale, Mass., Mar. 23.

Hamilton S. Brower, factory superintendent for Beech-Nut Packing Co., Rochester, N. Y., Apr. 4.

Murray T. Davidson, 67, founder of Jamestown Ice Cream Co., Jamestown, N. Y., Apr. 19.

Edmund H. Green, 75, retired Boston food broker, formerly associated with Green & Co., Cambridge, Mass., Apr. 14.

Charles Metz, 87, president of original Metz Bros. Brewing Co., Omaha, Neb., Apr. 10.

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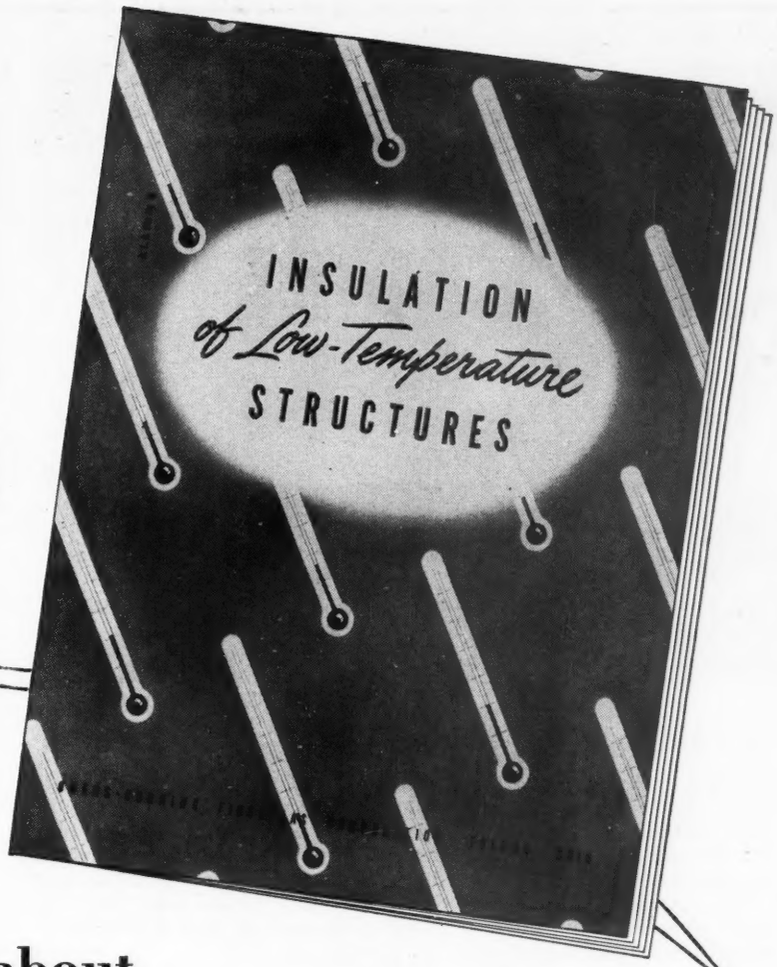
NEW!



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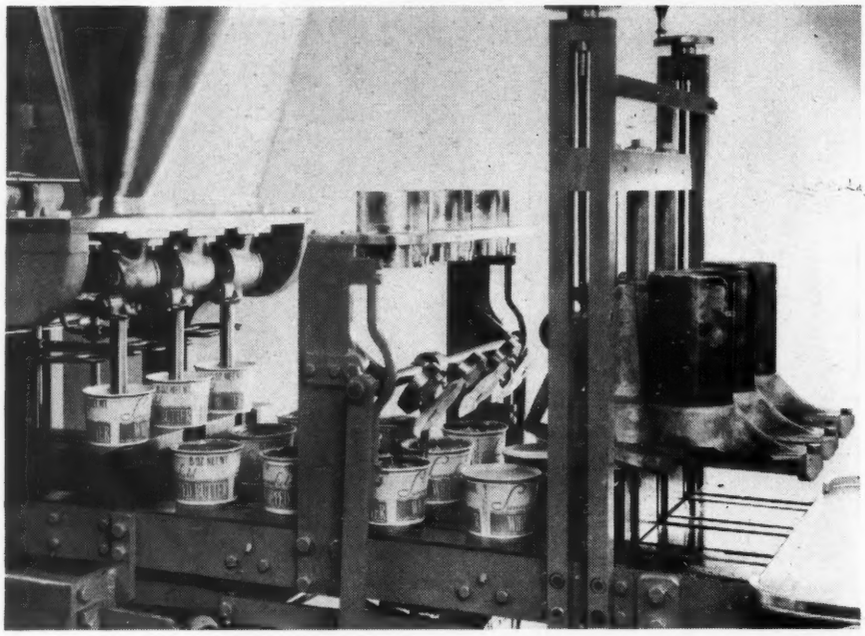
FOOD EQUIPMENT NEWS

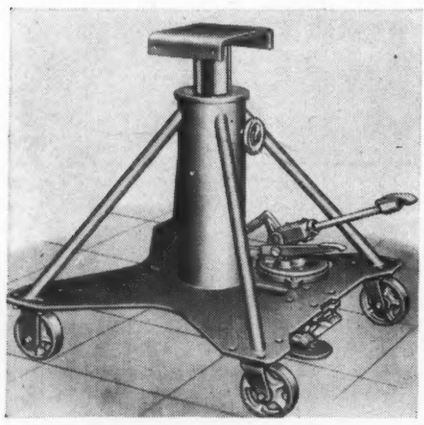


Automatic Parchment Paper Disc Placer 1

AN automatic parchment paper disc placing attachment is announced by the Hope Machine Co., Dept. I, Philadelphia, Pa. The paper discs are placed in a rack above the table with a stack of discs for each line of containers. The operating mechanism brings vacuum cups in position under each stack of papers. The opening of a valve cases vacuum to draw and hold a single paper disc against each set of vacuum cups. The mechanism brings the paper disc down to and presses it slightly on to the product. The vacuum valve is opened to release the vacuum. The friction of the product on the paper disc causes the paper disc to remain in place after the vacuum valves have been retraced and have begun the next cycle to pick the next paper cup from the stacks above. Placer has a wide application to those manufacturers who must place the paper discs to meet the health requirements, or to give their products the best possible appearance.

Hydraulic Table Unit 2

FOR special applications requiring an adjustable pedestal capable of handling 2,000 lb. loads LYON-Raymond Corp., Dept. I, Greene, N. Y. offers its standard hydraulic elevating table without the regular top. An 8 in. x 10 in. bracket is furnished for mounting special tools and fixtures. The platform elevates from 28 in. to 44 in. It can be locked in one position or allowed to revolve freely. A 30 x 30 in. base provides ample stability even for off-center loads while two 5-in. swivel casters and two 5-in. rigid casters make it easy to move about. A floor lock will hold the table firmly positioned when required. Elevation is provided by a hydraulic cylinder and single speed hydraulic foot pump with pedal release.

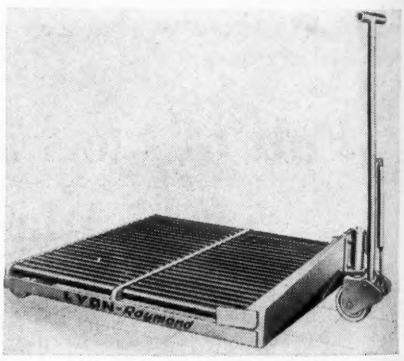


Low-Heat Control 3

A LOW-TEMPERATURE radiation pyrometer which makes possible accurate and close control of low-temperature processing is announced by the Brown Division, Minneapolis-Honeywell Regulator Co., Dept. I, Philadelphia, Pa. Control of low temperature, through radiation pyrometry, is especially useful where the measuring device does not or cannot come into contact with materials or processing equipment. The same principle has been used for years for extremely high temperature measurement and control. The new Brown low-range Radiamatic will find wide use in dairy and other food fields, where direct contact of instruments with materials is undesirable.

Pallet Switching 4

A SPECIAL truck for loading pallets inside a freight car and transferring them to a roller conveyor for movement to warehouse has been announced by LYON Raymond Corp., Dept. I, Greene, N. Y. Empty pallets are placed on a special truck having rollers instead of a conventional platform. This truck can be moved about inside a freight car or motor truck so that palletized loads can be made up from goods being recieved. When the pallet is loaded, the truck is moved to the doorway where a conveyor is set up leading to the warehouse. One side of the truck is lined up with the end of



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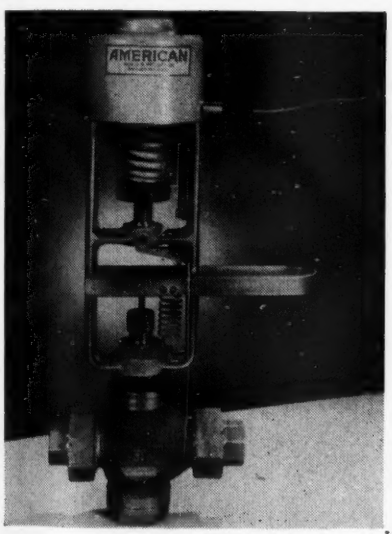
Food Industries Reader Service now makes it easy for you to follow up the news on new equipment and new materials.

Tear-out coupon cards are supplied for your convenience on the special colored page which follows the equipment news section in this month's issue. Enter your requests, fill out and mail cards, and let Reader Service do the rest.

the conveyor. The pallet is easily pushed on the conveyor system, which carries it to the warehouse floor. There it can be handled and stacked by conventional fork trucks. Specifications of this truck, when designed to handle the standard 48-in. pallets, include a double row of rollers on 2-in. centers. The top is 48-in. square and the truck is designed to handle up to 4,000 lb. For the application described the truck is furnished with a platform height of 5½ in. The small rear wheels are equipped with ball bearings and the large front wheels are furnished with Timken roller bearings. Hinged stops are provided so that the pallet cannot roll off the truck while it is being moved about. The handle is furnished with a self-contained hold-up device.

Limiting Regulator 5

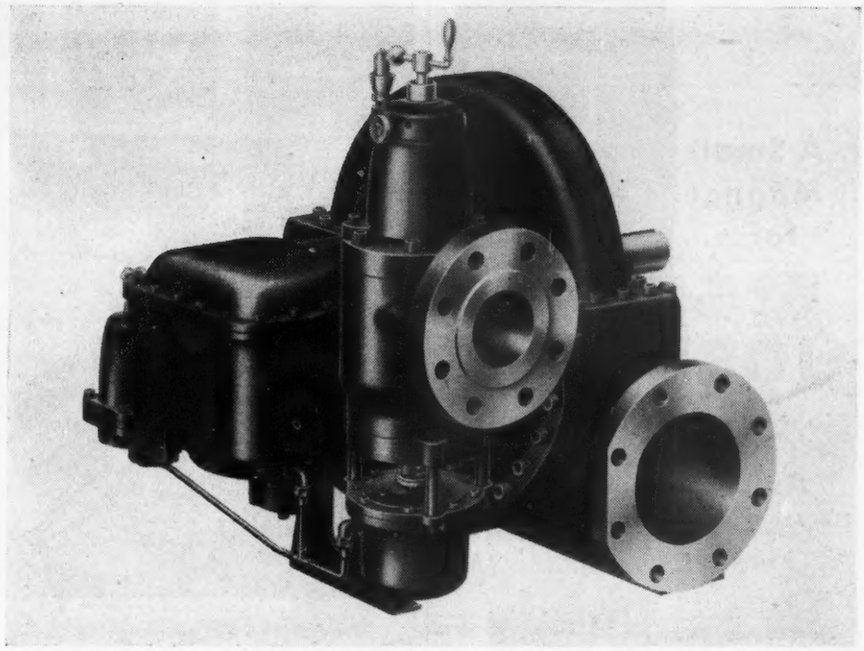
A NEW snap action temperature limiting regulator for use on processing machinery where a positive shut-off is



required when the critical temperature has been reached is announced by Manning, Maxwell & Moore, Inc., Dept. I, Bridgeport, Conn. The accuracy of actuation is secured by carefully ground and fitted stainless steel parts. A feature is the ease of manually resetting which is achieved by simply raising the "cocking" lever. They are made in three sizes: ½, ¾ and 1 in. and for temperatures from 20 to 345 deg. F.

All-Steel Skid 6

A NEW type all-steel skid with end racks has just been announced by the Palmer-Shile Co., Dept. I, Detroit 27, Mich. Especially designed for handling heavy loads with ease and safety. Built of heavy guage corrugated steel, with sturdy angle iron legs that provide ample clearance for fork lift or hand-operated trucks. Equipped with removable end racks to facilitate loading and unloading.

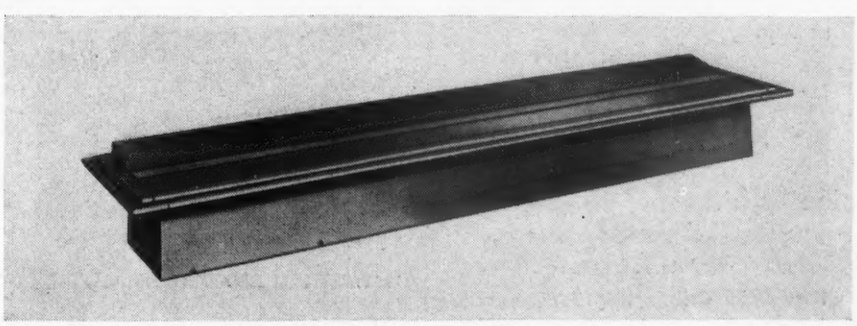


Small Mechanical Drive Turbine, 10-1200 HP. 7

A NEW small mechanical drive turbine, designated as Type DP, with ratings ranging from 10 to 1200 hp and with speeds from 1000 to 5000 rpm, has been announced by General Electric's Turbine Divisions, Dept. I, Schenectady, N. Y.

Designed on the basis of a G-E survey of hundreds of turbine users, the Type DP is available in three single-stage frame sizes with a 16-in., 20-in. and 25-in. wheel. Embodying such features of large turbines as hydraulic governing for wider speed range and more accurate control, and pressure oiling of bearings to insure positive lubrication, it can be applied as a drive for pumps, compressors, fans, blowers, and similar equipment. The new oil-relayed governing system gives superior performance over previous mechanical governors. Range of speed adjustment has been increased to 30 percent; speed regulation has been reduced to 6 percent. More parts are enclosed and the governing system is completely encased in an oil atmosphere, thereby eliminating rusting problems on standby service. A new balanced valve design is used for the governing valve and the combined trip-throttle valve. With this design less force is required to operate the valves, and a given size valve can handle larger steam flows. These valves are combined in one assembly.

Maintenance is made easier by the accessibility of individual components such as the oil cooler, oil pump, and steam and oil strainers. The great majority of parts are interchangeable on all Type DP frame sizes. Spare parts kits, with parts applicable to these standard turbines, are available.



Heavy Duty Non-Electric Magnetic Separator 8

A HEAVY duty non-electric magnetic separator known as the "Giant" has been added to the line of permanent magnets of the Eriez Manufacturing Co., Dept. I, Erie, Pa. It is extremely useful in removing tramp iron from bulk foods.

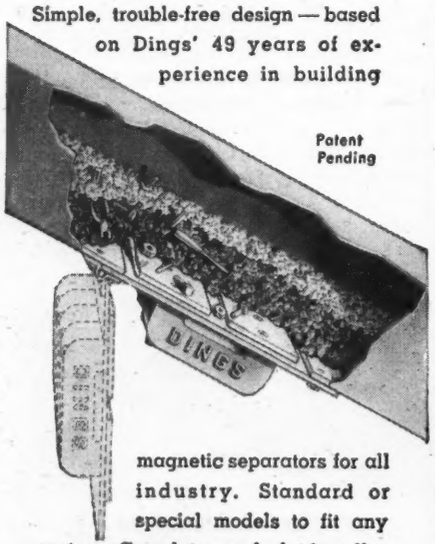
Special face plates are built of abrasive-resistant steel and are furnished in either a flat or stepped pole face. Two models available. One is for stationary installation in open gravity flow chutes. The other, equipped with hinges and latches, is recommended for enclosed gravity chutes. Hinges permit the unit to be swung down for easy cleaning.

Both of the models are fully insulated to allow direct installation on steel. "Giant" magnets are available in sizes ranging from 6 in. upward and can be built any width.

A Small Magnet for a **BIG JOB!**

New DINGS ALNICO
PERMA•PLATE MAGNET
For Removal of Tramp Iron

It's the lightest . . . most powerful . . . least expensive Alnico magnet available. Highest grade Alnico . . . magnetic permanence guaranteed for mechanical life of installation! Simple to install in chutes, ducts, pipes and above belts. Non-electric . . . no operating or maintenance expense . . . easy to clean. Removes tramp iron from all dry products — protects machinery . . . prevents fires and explosions caused by tramp iron sparks . . . keeps products iron-free. Simple, trouble-free design — based on Dings' 49 years of experience in building

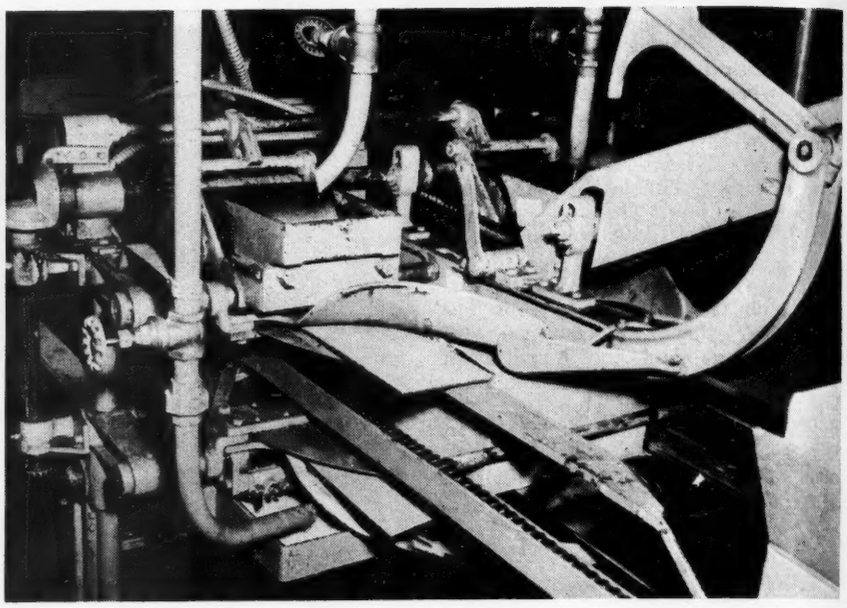


magnetic separators for all industry. Standard or special models to fit any system. Complete, ready for installation. Quick delivery. *Write for new bulletin.*

DINGS MAGNETIC SEPARATOR CO.
4741 W. McGeogh Av., Milwaukee 14, Wis.

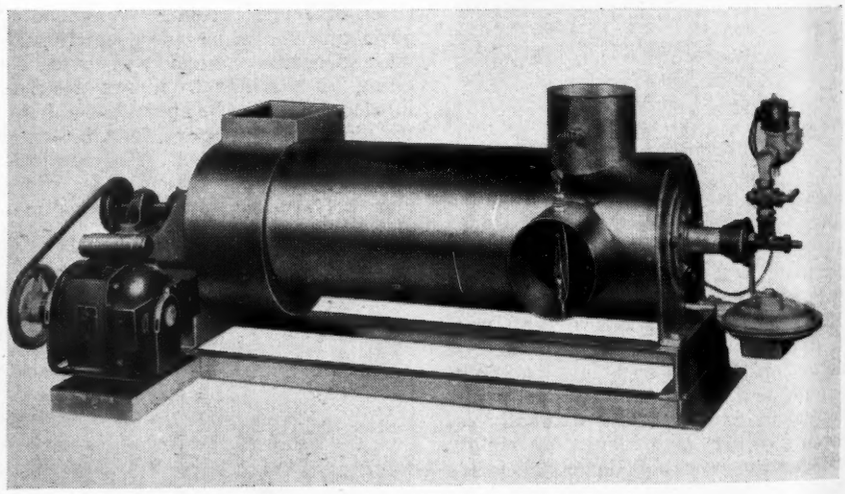
Only manufacturer of a complete line of Permanent and Electro Magnets for every purpose.

"Since 1899"
Dings
"HIGH INTENSITY"



Case Sealing Glue Flows to Machine Glue Pans 9

A NEW shipping case sealing adhesive designed especially for automatic case sealing machines has been announced by Paisley Products, Inc., Dept. 1, Chicago and New York. Designated Boxseal Glue, it will seal the flaps of Fourdrinier kraft, cylinder kraft and jute lined corrugated containers, as well as the solid fiber types. It is described as a liquid converted starch derived adhesive. The method of manufacture increases the adhesive power obtainable from the raw materials. It enables the glue to coat a thinner, more cohesive film on the container board without excessive penetration into the board fibers. The makers point out that Boxseal remains in a fluid condition indefinitely, permitting it to be piped directly to the machine glue pans without danger that the adhesive will solidify in the pipes.



Industrial Heater Is A Package Unit 10

THE Midget Utility Air Heater with improved design features is now available as a complete package unit, Gas Appliance Service, Inc., Dept. I, Chicago, has just announced. In addition to the heater, the package includes fan, motor, drive, safety devices and temperature controller.

The heater is direct fired, for maximum efficiency. With a heating capacity of 125,000 Btu per hour, the heater is suitable for temperatures up to 350 deg. Fahrenheit. The bricklined combustion chamber affords complete combustion of gas. The burner has good turn-down range, allowing proper temperature control. The fan capacity is 1000 c.f.m. The hot air can be recirculated for greater fuel economy. Both the burner output and air volume can be regulated for progressive temperature control and air circulation. The midget heater is low in cost, easy to install and simple to operate. Temperature controls of either the indicating or non-indicating type are furnished as desired. The safety devices are designed to shut off the gas supply.

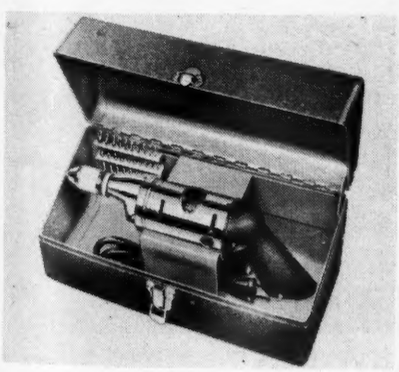
Control Timer 11

ITS latest type TAG Time-Schedule Controller has been announced by C. J. Tagliabue Corp. (N. J.), Dept. I, Newark 5, N. J. The timer can be synchronized with any existing system of air-operated, semi-automatic temperature and pressure control to make the process fully automatic. In use the operator begins the process by pressing the starter push button on the timer. A signal light above the button flashes on to indicate the process is under way. By means of an adjustable cam, timing begins immediately, or, if desired, when the temperature has

reached the processing point. This temperature is maintained for the predetermined length of time. All valves—steam, air, drain, overflow and cooling water are operated as the process may require and all manual adjustments heretofore performed by the operator are eliminated. At the completion of the process and the cooling period, the signal light is extinguished, indicating visibly that the process cycle has been completed.

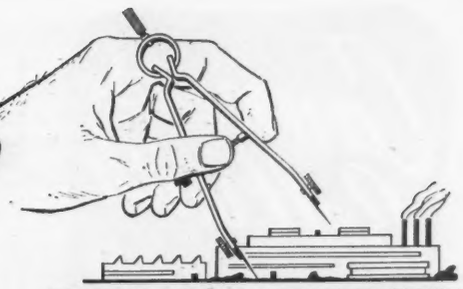
Electric Drill Kit 12

A HI-POWER Model 77 electric drill kit has been announced by Portable Electric Tools, Inc., Dept. I, Chicago. It includes company's own ¼-in. portable electric drill and ten high-speed drills all arranged in a handy steel,



hinged-cover carrying kit. The drill is of a full ¼-in. capacity, with a 110-volt, a.c.-d.c. air-cooled motor; chromium-plated, rustproof finish on the body; black, fine-wrinkle finish on the pistol-grip handle with durable trigger switch. A slender body makes it easy to drill in close places. The drill weighs only 2 lb. 12 oz.

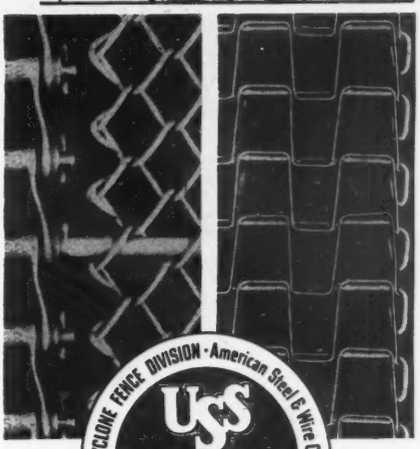
Cyclone



Metal Conveyor Belts . . . tailored to your operation

Cyclone engineers and technicians will study your operations and design a Cyclone Belt to fit your plant. Cyclone has been making metal belts for industry for over 25 years.

Cyclone Conveyor Belts are made in *Chain Link, Flat Wire* and *Flex-Grid* styles. When made from the right metal, they are impervious to steam, water, oil, heat or chemicals.



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By the makers of Cyclone Fence
CYCLONE FENCE DIVISION
(American Steel & Wire Company)
Dept. H-68, Waukegan, Illinois
United States Steel Export Company, New York

CYCLONE FENCE DIVISION · American Steel & Wire Co.
USS CYCLONE "Red Tag" CONVEYOR BELTS
UNITED STATES STEEL

UNITED STATES STEEL

Guardians OF THE NATION'S FOODS

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UNITED STATES COLD STORAGE

Four Modern Fortresses For Guarding The Nation's Foods

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500 EAST THIRD ST.
ZONE 6

Sturdy BUFFALO solid-woven cotton belting impregnated with neoprene synthetic or natural latex has a *snap* and wear-resistance that make it the ideal belting for cannery service.

This fine-quality BUFFALO belt is especially designed for conveying vegetables, fruits and other food products where moisture is prevalent. Acids which attack ordinary cotton belting have no destructive effect on BUFFALO Latex Canner's Conveyor Belting.

Other BUFFALO *Latex* features are: 1) No seams to split—no plies to separate 2) Maximum pliability 3) High tensile strength 4) Odorless 5) Low operating cost.

Write for further information and sample

Other Buffalo Weaving and Belting Company products including: Plastex Belting • RF & C (rubber-covered) Belting • Solid Woven Cotton Belting • Glazed (nitro-cellulose coated) Belting.

BUFFALO
WEAVING & BELTING CO.
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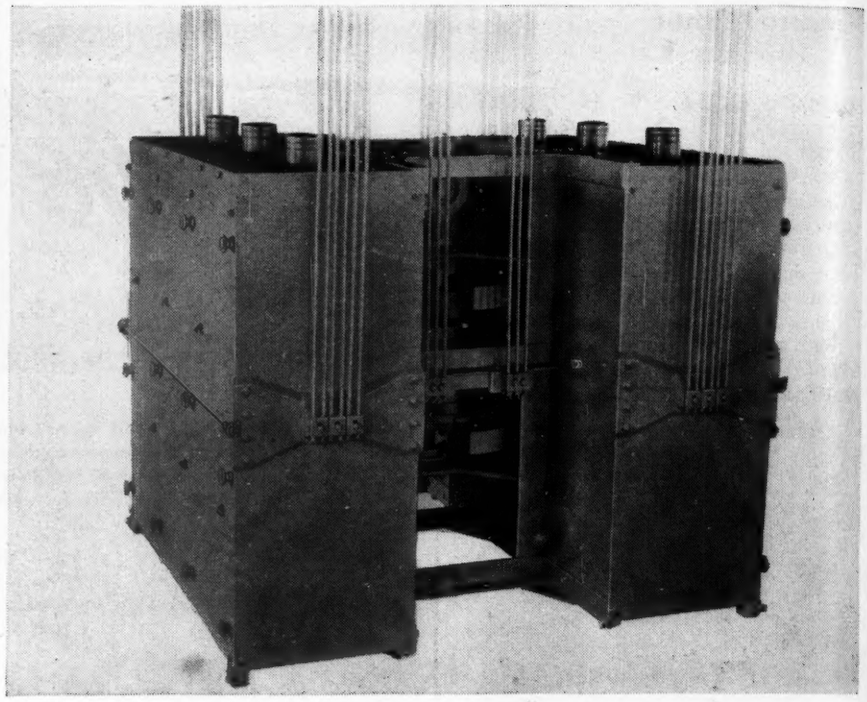


Sectional High and Low Speed Sifter 13

A NEW series of high and low speed sifters embodying an entirely new idea in sieve clamping devices is now being produced by The Wolf Company, manufacturers of flour milling machinery, Dept. I, Chambersburg, Pa. Used for sifting, grading and bolting of granular and pulverized material, the LB sifter is made in 2, 4 and 6 sections, with varying number of sieves stacked in each section. For sanitary purposes the new sifter has been streamlined from top to bottom, outside and inside. Sifter boxes are smooth and easy to clean and keep clean.

Each section of the sifter box is equipped with the newly designed clamping device. Sieves can be clamped from a standing position on the floor. Patented free-swinging drive gives perfect circle action without strain on sifter boxes. No connecting flexible shafts or castings are needed on the ceiling or floor. This sifter can be furnished with angle gear transmission or motor drive.

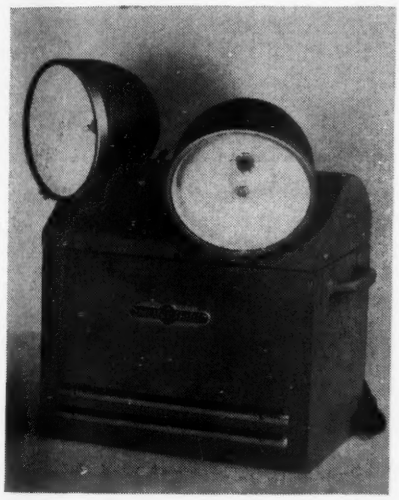
Power Sweeper Has Vacuum Dust Control 14

A HIGH speed power sweeper, with a 36-in. revolving brush and vacuum dust control, has been introduced by the G. H. Tennant Co., Dept. I, Minneapolis. The machine is specially designed for fast dust-free sweeping of bakery garages, driveways, large flour storage rooms and other open areas in food processing plants, bakeries and mills. The unit drives like a car, makes sharp turns (128 deg. total arc) and enables one man to sweep flour, seeds, dust and litter from floors at the rate of 20,000 to 50,000 sq. ft. per hour. Power is provided by a 6 hp. air-cooled gasoline engine, equipped with a self-starter. For bakeries, mills and food plants generally, the most interesting

feature is the dual brush and vacuum system. The 36-in. fiber or steel wire brush revolves inside of a snug-sealed compartment. Litter, flour and heavy dust are hurled forward into a 9 cu. ft. removable hopper. At the same time, lighter dust is sucked up into a double-envelope fabric bag.

Emergency Lighting 15

A PORTABLE self-contained emergency lighting system known as "Minuteman" is announced by Electric Cord Company, Dept. I, New York 7, N. Y. It supplies instant, automatic light from its own power when the usual source of current fails. Each lamp head delivers about 100 watts and is capable of illuminating an area of approximately 10,000 sq. ft. for about five hours. The lamp heads are adjustable



to any position and may be removed from the unit for installation on walls, stairways, etc. When normal current is resumed the lights automatically go out and a built-in charger restores power to the battery for the next emergency. No special wiring is required. Plug unit into any convenient outlet in the lighting circuit and it is ready for emergency service. The "Minuteman" is approved by the Underwriters Laboratories.

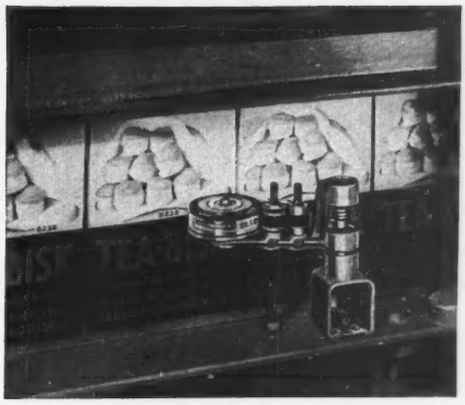
Tachometer Recorder 16

A NEW speed and production recorder, model R-300-H, has just been announced by the Electric Tachometer Corp., Dept. I, Philadelphia, Pa. The rugged, gear-driven unit is electrically operated and produces a permanent record of speed and production when properly installed on any industrial machine. The recorder consists essentially of a synchronizing contactor which may be attached to and driven by the prime mover or industrial machine. A patented step-by-step motor in the recording instrument is electrically connected to the contactor and follows its motion. This motor, by means of gears and feed screw, drives a steel stylus across the wax-coated chart. At one-half minute intervals the master

Eliminate
COSTLY MANUAL MARKING
with ROLACODER

MARKS CONTAINERS IN MOTION
Automatically!

Cut packaging payroll costs! ROLACODER marks code-dates, lot numbers, colors, flavors, etc., on containers as part of sealing or conveying operation. Makes clean, *sure* imprints containing up to 5 lines of copy on BAGS—BOXES—CARTONS—CASES—CANS—PAPER CONTAINERS—DRUMS—SHEET ROLLS, etc. Friction-operated, self-inking. Uses quickly interchangeable rubber type. Available with or without mark-centering mechanism.



ROLACODER is used by leading companies throughout the world!

Write for Data Sheet No. 6.0, describing ROLACODER models.

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ADOLPH GOTTSCHO, INC.
MACHINES TO MARK WHATEVER YOU MAKE

see our CATALOG in SWEET'S FILE

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO-GRAM RATIO COUNTING SCALE
Another Detecto-Gram Scale to speed counting operations. Model #1743 has a special counting tray attached to the beam for use when counting in odd amounts.
Write for Catalogue

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MAKERS OF FINE SCALES SINCE 1900
1006 MAIN STREET · BROOKLYN 1, N. Y.
SCALE ENGINEERS IN ALL PRINCIPAL CITIES

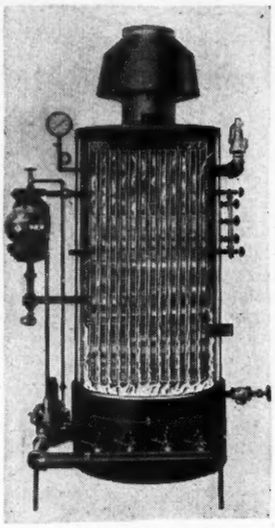
Engineered

STEAM AT ITS BEST---

THE KANE BOILER PACKAGE

Yes, it's a compact, self-contained steam source that includes: the correctly sized KANE Automatic Gas-Fired Boiler complete with burner and controls to maintain required steam pressure; *and* an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

Engineered Steam at its best with four decades of experience at your disposal—so, send *your* steam problem to us for study and recommendation.



The KANE Boiler is built to A.S.M.E. specifications, in sizes to 30 H.P.

MEARS-KANE-O'FELDT INC.

1903-1915 EAST HAGERT STREET, PHILADELPHIA 25, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

New! **TERRISS 3-SPEED**

PORTABLE MIXER

STIRS • BLENDS
MIXES • AGITATES

No more carrying heavy mixer . . . clamping to tanks . . . breaking side walls.

The New TERRISS 3-Speed Portable Mixer is an all-around unit that will take care of all your mixing, blending and agitating problems. If your tank or vat is below floor level the TERRISS 3-Speed Mixer will reach down and do a real job for you. If your container sits on the floor, a little adjustment and the mixing begins. If your tank or container is high off the floor, the TERRISS Mixer will lift up and do the mixing job.

All parts that touch your product are Stainless Steel. Standard belt drive permits propeller speeds of 175 RPM, 325 RPM and 575 RPM. Other combinations are available with simple adjustments. Both propeller shaft and stand are adjustable, permitting unlimited settings to fit any job in your plant.

Send your order today . . . money-back guarantee.

TERRISS

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MANUFACTURERS SUPPLYING THE PROCESSING INDUSTRIES

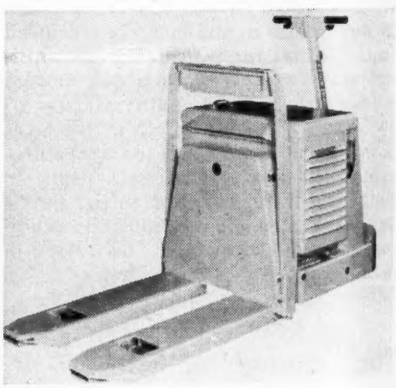
DEPT. F, 22-24 WOOSTER ST. **NEW YORK 13, N. Y.**

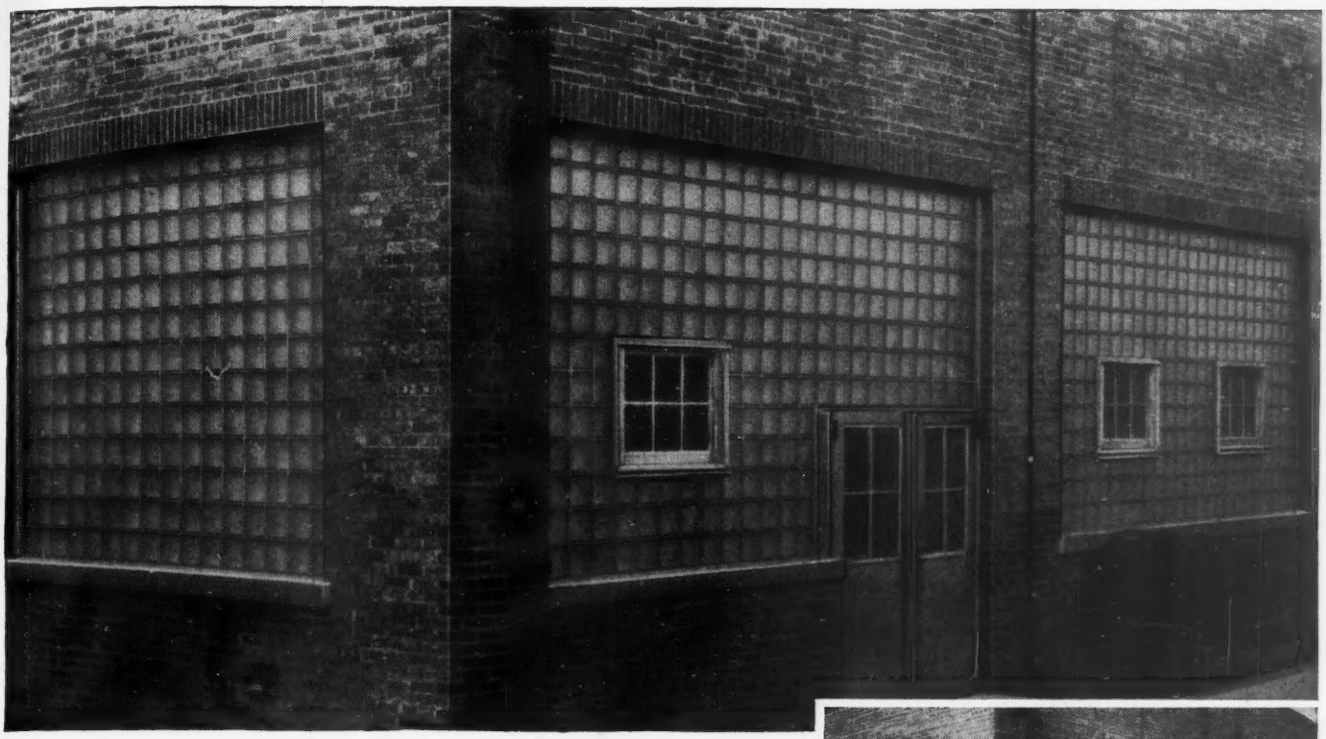
clock, an integral part of the system, makes contact to disengage the feed screw which is revolved backwards by a return spring restoring the pen arm to zero. The same contact feeds the chart downward at the rate of 2 in. per hr. This cycle of operations, when repeated, produces a series of parallel lines, the length of which is proportional to speed or production. The ends of the lines form a speed curve.

The recorder produces a continuous record of operating speed, showing the slightest irregularity in speed, as well as idle time. It provides a basis for comparing one run with another for analyzing the cause of stoppages, for increasing production, and reducing costs. It is guaranteed to have an accuracy of one-half of one percent of full scale. This accuracy is positively maintained as long as the instrument is operative. Since the recorder is electrically driven, it may be installed at any remote position desired — the superintendent's office, near the foreman's desk, or in another building.

Industrial Truck 17

A NEW worksaver truck for handling skids and pallets has been announced by the Materials Handling Division of The Yale & Towne Manufacturing Co., Dept. I, Philadelphia, Pa. Truck was designed to solve three problems with which food manufacturers are confronted: (1) the problem of handling both skids and pallets when plants are converting from skid systems to pallet systems but wish to continue using the remaining skid inventory; (2) the problem of receiving and shipping materials on suppliers' or customers' skids when the plant uses pallets, or vice versa; (3) the problem of coordinating skid and pallet systems when both systems are used in different departments within the plant. It is essentially a pallet-type worksaver, fitted with a simple fabricated superstructure which lets down over the pallet lifting-frame to make the unit suitable for handling skids. The standard model can handle skids from 6 to 12 in. high. When not in use the frame locks into a vertical position and the truck can be used for handling pallets. Speeds are controlled from the handle of the truck.





REPLACE WORN WINDOW SASH WITH

PC Glass Blocks

THE MARK OF A MODERN BUILDING

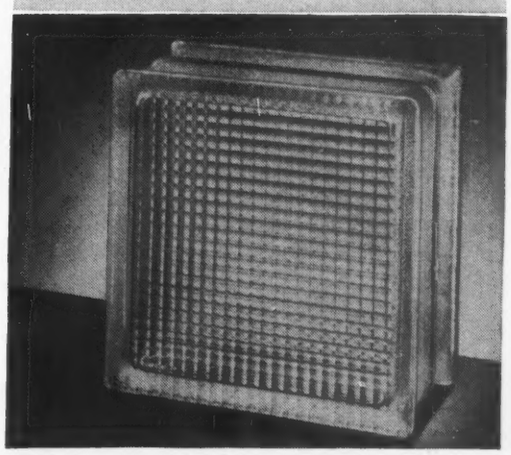
In plants where high acid atmospheres and excessive humidity are encountered, ordinary wood and metal window sash need frequent painting, repairs and maintenance. With PC Glass Blocks there is no sash to rot or corrode. You get better lighting, better insulation—and save money too—when you replace worn sash with PC Glass Blocks.

NOW you can improve operating conditions in your plant—and reduce operating costs—by replacing worn window sash with PC Glass Blocks. The blocks are available for prompt delivery. They can be installed at once, no waiting for hard-to-get metal.

Lighting panels of PC Glass Blocks distribute natural daylight over large working areas, prevent infiltration of harmful dust and grit. Their insulation value cuts heating and air-conditioning costs, minimizes condensation.

Glass block panels need no paint. They rarely need repairs or replacement, are easily kept sparkling clean. Savings in maintenance costs add up to important money over the years.

Whether you are planning sash replacement or new construction, you will need complete information on PC Glass Blocks. It is available in our new booklet. Send for your free copy—*today*. Pittsburgh Corning Corporation also makes PC Foamglas Insulation.



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Distributed by PITTSBURGH PLATE GLASS COMPANY
by W. P. Fuller & Co. on the Pacific Coast and by Hobbs Glass Ltd. in Canada

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Please send along my free copy of your new book on the use of PC Glass Blocks for Industrial Buildings. It is understood that I incur no obligation.

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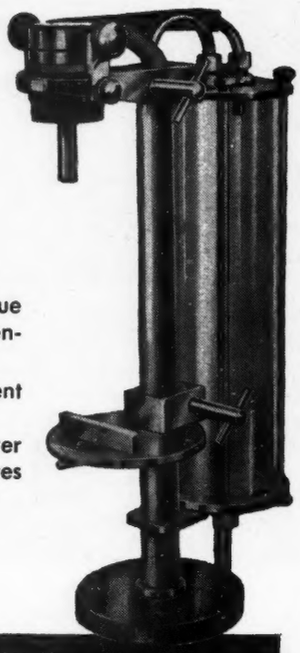
EKEM for efficient filling



Simply . . .
Cleanly . . .
Correctly . . .

"EKEM" with world-wide reputation. Unique in design based on latest developments in scientific research.

"EKEM," the most outstanding and efficient machine for solving filling problems.

Firms of reputation invited to take over agency and manufacture for the United States and Canada.

FILLING EKEM MACHINES

HEADQUARTERS OF
EKEM ENGINEERING (S.A. PTY.), LTD.
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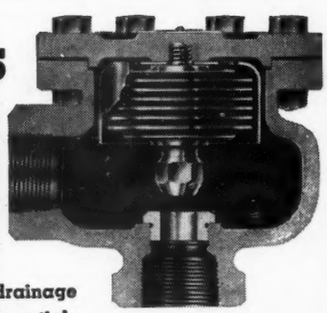
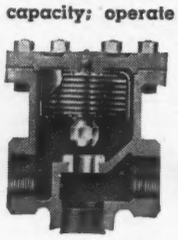
JOHANNESBURG. P.O. BOX 947.

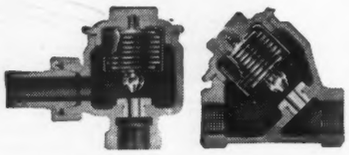
Nicholson Simplicity Enables You to

STOP ADJUSTING
Steam Traps



Nicholson traps require no adjustment or change of valve and seat from 0 to 225 lbs. This feature proves an exceptional trouble-saver in plants with many and varied trap applications. With these other 5 features, it accounts for the increasing standardization on Nicholson traps: 2 to 6 times average drainage capacity; operate on lowest temperature differential; no freeze-ups, air-binding, nor water-logging.

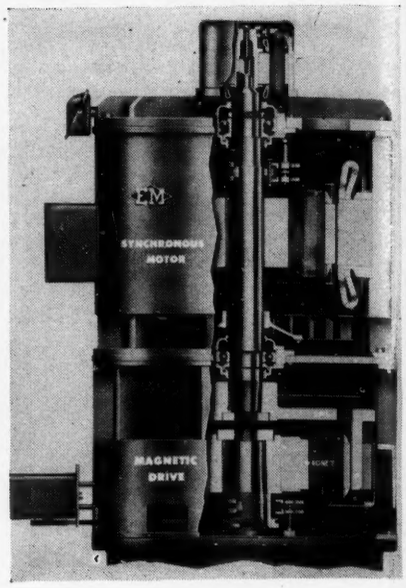




5 TYPES FOR EVERY PURPOSE—process, heat, power; size ¼" to 2"; press. to 225 lbs. BULLETIN 1047 or see Food Industries Catalogue.

HIGH PRESSURE FLOATS in all sizes and shapes; welded; stainless, monel, steel. For operating mechanisms and as tanks or vessels. 2-day delivery. **BULLETIN 348**

W. H. NICHOLSON & CO. 193 OREGON STREET WILKES-BARRE, PA.
Valves • Traps • Steam Specialties

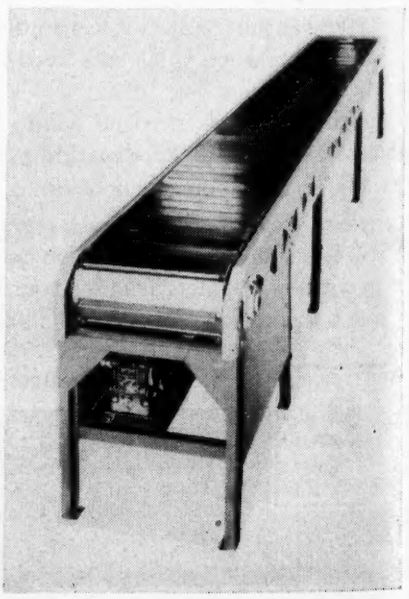


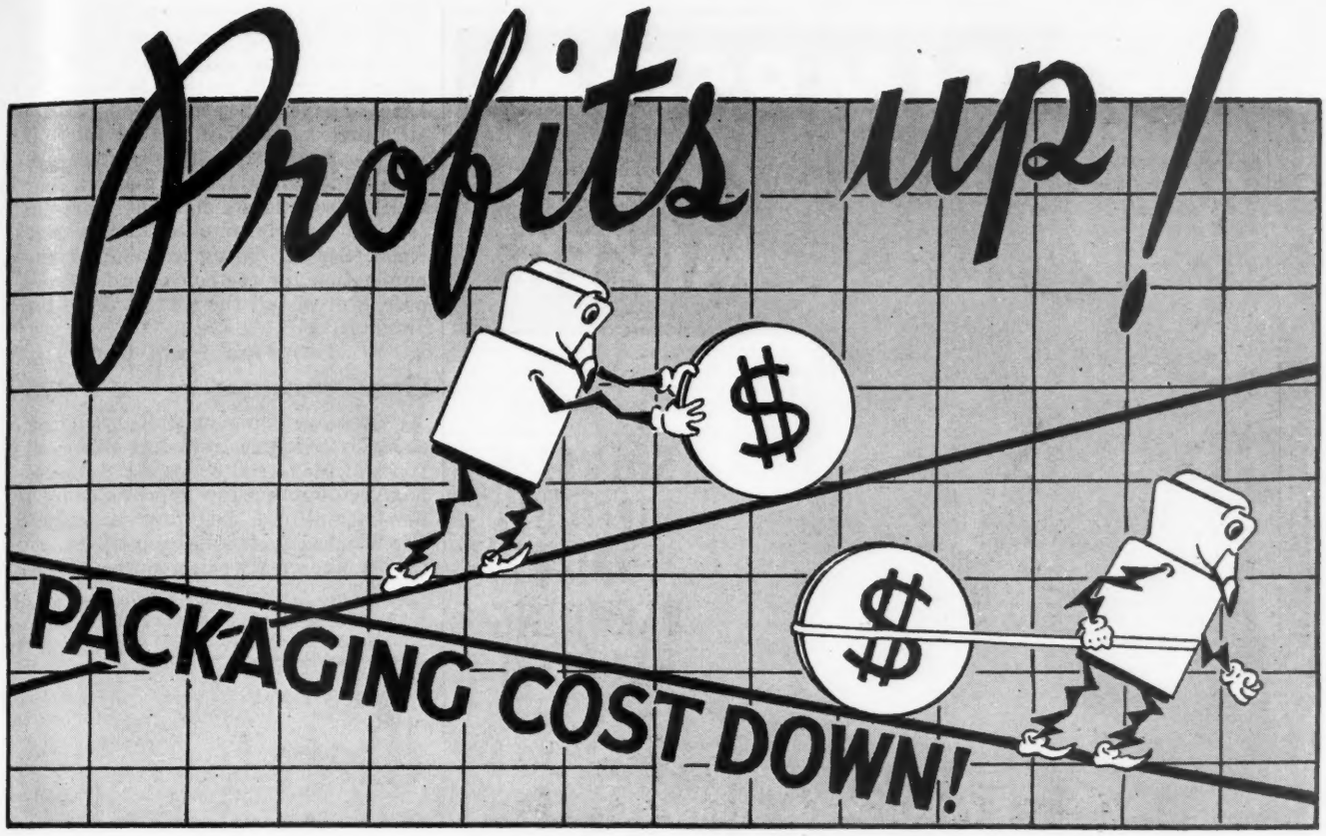
Vertical Drive Unit 18

A NEW adjustable-speed vertical drive unit for centrifugal pumps is announced by Electric Machinery Mfg. Co., Dept. I, Minneapolis 13, Minn. The "Vertical Synchronous Motor Magnet Drive Unit" gives smooth, adjustable speed control. Motor drives the ring of the magnetic drive at constant speed. Magnet member of magnetic drive mounted on gear shaft operates the pump at speed required by liquid level control. Unit offers smooth, wide-range speed control, precludes "hunting" and eliminates frequent motor starts and stops.

Steel Belt Conveyor 19

A NEW method for custom building of conveyors has been announced by the Sermat Conveyor Corp., Dept. I, Chicago, Ill. The new Flex-E-Unit steel belt conveyor is composed of a head or drive section and takeup section at the opposite end. Each of these basic sections is five feet long and when com-





WRIGHT'S Hy-Tra-Lec Weighs and Fills Dry Products At High Speed With *ACCURACY!*

A superior method is now available for weighing and filling free-flowing and semi free-flowing dry products. This new method is based on the principles of "positive displacement". It's exclusive with Wright's Hy-Tra-Lec automatic net weighers. Range: one-half ounce to 16 ounces. Recommended when extreme accuracy at high speed is desired. Users report a savings in their weighing-packaging operation of from 18 to 59 per cent!

WRIGHT'S Automatic Machinery Company

AFFILIATED WITH THE SPERRY CORPORATION

WRIGHT'S AUTOMATIC MACHINERY COMPANY
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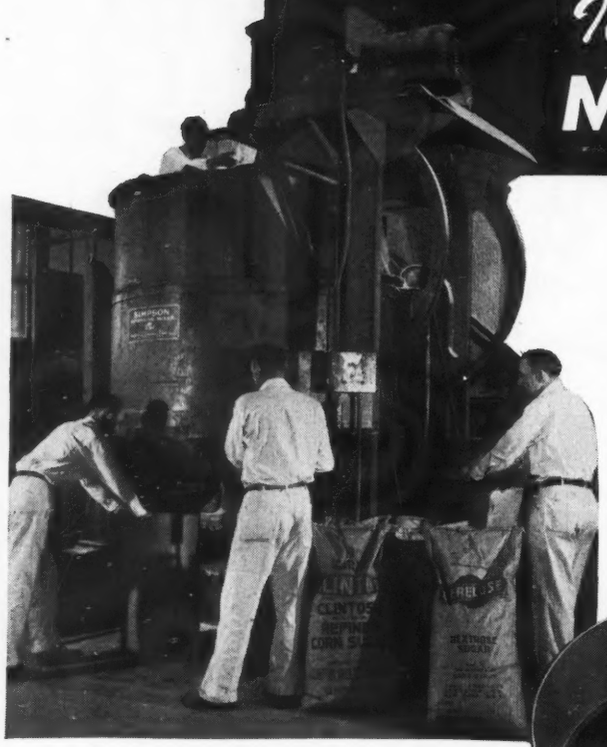
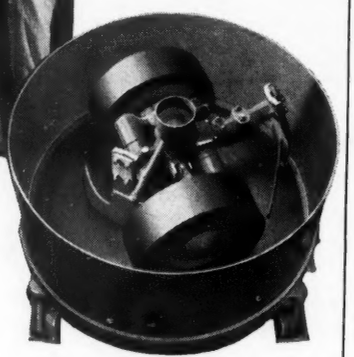
"Pioneers Since 1893 In Automatic Packaging Machinery"

OFFICES IN NEW YORK, CHICAGO, DURHAM, AND SAN FRANCISCO

SIMPSON *Intensive* MIXER



SOLVES A DIFFICULT SPICE BLENDING PROBLEM



A large midwest spice manufacturer had difficulty in uniformly mixing and blending a proportionately small amount of Cream of Spice into a carrier. The seasoning was not thoroughly dispersed in the carrier in the first mixing operation in a ribbon type mixer, and a time-consuming grinder operation was necessary to complete the dispersion. A Simpson Intensive Mixer was installed and, in a single operation, thorough mixing was accomplished.

THE MULLING PRINCIPLE OF CONTROLLED MIXING

The unique "mulling action" of a Simpson Intensive Mixer, shown above, is comparable to the rubbing, kneading and smearing action of a mortar and pestle. This kind of mixing action eliminates any "balling" of materials and quickly effects a thorough dispersion of the elements in the mix. The result is a finished product of uniform quality. Because of the positive control obtained throughout this mixing process, it is known as "Controlled Mixing".

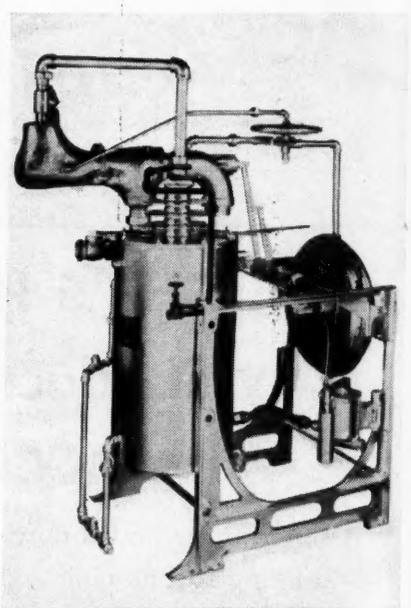
• *Simpson Intensive Mixers are available in 10 sizes, from 1/5 to 50 cu. ft. capacity for mulling every type of dry, semi-dry or plastic material. Also available with oil, steam or water jackets for vacuum mixing, and may be had in corrosion-resistant materials. Let a National Engineer analyze your mixing requirements.*

NATIONAL ENGINEERING COMPANY
614 Machinery Hall Building • Chicago 6, Illinois

bined they form a 10-ft. all-steel conveyor. This basic arrangement can be lengthened to as much as 175 ft. by adding 4- or 5-ft. sections between the head and takeup ends. Heavy-gauge steel flights and chain are one integral unit for smooth operation at any speed within the range. Unit is made in four widths from 12 in. to 36 in. wide, in either 3- or 6-in. pitches. Rating is 30 f.p.m. Sermat, after learning of the application for the conveyor from the user, will install the correct drive for ample power.

Gas Generator 20

VAPOFIER, a compact unit producing safe, low-cost gas from fuel oil for all types of industrial ovens and furnaces has been improved in appearance by a new steam-lined, cast-aluminum chassis, which also facilitates periodic attention and makes this generator practically trouble free. According to the manufacturer, Vapofier Corp., Dept. I, Chicago 43, Ill., the unit is extensively used as a gas "standby" because of its quick switchover to gas without interruption of flame or change of flame quality.



Cab for Fork Truck 21

A WELDED steel, sound-insulated, all-weather cab for use on the "Yardlift-40", pneumatic-tired fork truck, is announced by the Trucktractor Division of Clark Equipment Company, Dept. I, Battle Creek, Mich. The cab is fully enclosed, with entrance door on the driver's side. It is equipped with sliding windows, safety glass throughout, and an upper window of glare-proof glass to aid high stacking. The interior is finished with a sound-deadening insulating compound. Rear-view mirror and windshield wiper are standard equipment. The cab is easily mountable for field installation. The cab is built by Allen Industrial Products for the Clark "Yardlift-40".

CATALOGS, BULLETINS

This digest of manufacturers' new publications is offered by FOOD INDUSTRIES Reader Service as a convenience for executives. The editors feature catalogs, data sheets and technical pamphlets likely to interest purchasing agents, superintendents, packaging men and food technologists.

Food Plant Equipment

Couplings 51

American Flexible Coupling Co.—24-page illustrated booklet explaining causes of bearing failure, shaft failure and equipment damage due to improper coupling. Defines function of a true flexible coupling.

Bakery Equipment 52

Read Machinery Div. of Standard Stoker Co. —60-page catalog, describing and illustrating complete line of READCO bakery equipment. This is a reference manual for bakery owners who wish to replace wornout equipment or expand present facilities. Catalog gives complete specifications and describes construction and performance of dough mixers, vertical mixers, flour handling equipment, ovens, proofers, roll machines and cooling units.

Fractional HP. Motors 53

Torq Electric Corp.—4-page bulletin describing new line of Torq F.H.P. motors now in production. Types are SI, high load capacity; CSI, capacitor start; and P, polyphase motors. Features are new Syncrosnap starting switch and Temprotex thermostatic overload protector.

Silent Chain Drives 54

Link-Belt Co.—48-page book No. 2125, covering industrial standard silent chain drives Complete stock drives in sizes from ½ to 50 hp. are tabulated in easy-to-use selection tables.

Arc Cutting Tool 55

Eutectic Welding Alloys Corp.—8-page illustrated bulletin on application of low cost surface and underwater metal cutting tool employing "CutTrode" electric arc vapor. Complete information, technical diagrams, instructions for using CutTrode for large industries and smaller shops. Operating hints outlined for all metal-working men handling repairs or production metal cutting.

Flexible Monel Tubing 56

Titeflex, Inc.—Folder describing Titeflex Monel metal flexible tubing. Includes complete descriptions of physical properties and corrosion-resistance of tubing.

Storage Batteries 57

Gould Storage Battery Corp.—8-page folder on types of storage batteries for various uses, including electrical and construction details.

Woven Wire Cloth 58

The Cambridge Wire Cloth Co.—4-page bulletin No. 91 illustrates various applications of company's wire screens.

Bag Flour Packers 59

Pneumatic Scale Corp., Ltd.—6-page illustrated bulletin No. 107, giving full details on three bag-flour weighers—for small, medium and large bags.

Bearing Computation 60

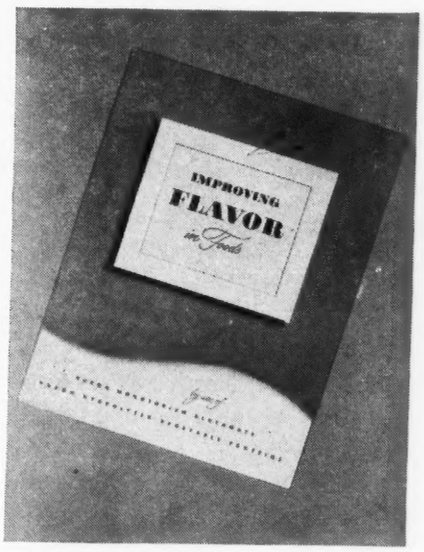
New Departure Div. of General Motors Corp. —Fourth in a series of books for engineers. Explained is process of computing bearing reactions using the three conditions of equilibrium, and there follow typical examples numerically worked out for various types and arrangements of gears. (Previously issued in this series: Part One, Bearing Types, Uses and Mounting Methods; Part Two, Details of Design of Shafts and Housings, and Part Three, Enclosure and Lubrication of Ball Bearings.)

Aluminum Alloys 61

Reynolds Metals Co.—48-page booklet of technical information relative to various sheet and plate alloys, gages and sizes. Designed to meet needs of experienced users of aluminum and also to give the newcomer clearer insight into advantages of aluminum.

Monosodium Glutamate 62

The Huron Milling Co.,—12 page illustrated bulletin, "Improving Flavor in Foods," lists various uses for its monosodium glutamate and hydrolyzed vegetable protein products. Bulletin gives background of these flavoring aids and tells how processor may use them in a



variety of foods. There are specific recommendations as to which products to use, and how much of them, in such items as canned baked beans, bouillion cubes, chili con carne, chop suey and oriental-type foods, cooking sauces, gravies, meat products.

Ice Crushers 63

Link-Belt Co.—16-page illustrated book No. 2261 on top-icing with snow ice, using company's ice crusher-slingers. Illustrates, lists and describes various models of ice slingers now available and contains many views of actual installations.

Steam and Water Mixer 64

Sarco Co., Inc.—Catalog 900 describes a new steam and water mixer to provide hot water at isolated points. Two-color cut-away photos show operation, installation and construction. Convenient capacity and dimension tables are included.

Packaging Equipment 65

Triangle Package Machinery Co.—6-page illustrated bulletin on automatic and semi-automatic vibratory feed weighers for weighing and filling of dry products into any style container. Principle of weigher operation is presented diagrammatically. Models described handle from 15 to 180 packages per minute—¾ oz. to 5 lb.

Unit Substations 66

Allis-Chalmers — Bulletin No. 11B6935 on multi-circuit unit substations details construction of three transformer types — oil-filled, "Chlorextol" liquid-filled and dry-type. Also described are construction highlights of load ratio equipment and metal-clad switchgear.

Y-Type Pipe Strainers 67

Armstrong Machine Works—Bulletin 184, describing ½ in to 2 in. cast semi-steel Y-type pipe strainers for steam, gas, air, water and oil lines. Strainers employ either perforated brass screens or fine-mesh woven stainless steel screens.

Tube Fittings 68

Flodar Corp.—12-page catalog describes role of tube fittings in sealing of higher fluid pressures. Engineering specifications are presented for both Flodar Fluid Fortress no flare fitting and Grip Tube flare type fitting.

Minute Quantity Pump 69

The Milton Roy Co.—2-page bulletin describes piston type pump developed to handle liquids in precisely controlled volume, to deliver at a constant rate of flow (without pulsation), and to pump in minute quantities down to as little as 75 ml. per hour.

Packaging Equipment 70

Roto Bag Machine Corp.—Leaflet describes and illustrates bag making machines for heat-sealing coated materials, cellophane, diafane and aluminum foil. Specifications are listed.

Continuous Evaporator 71

Artisan Metal Products, Inc.—2-page illustrated bulletin describes continuous evaporator and stripper. Operating principles and engineering facts are given.

Metal Assemblies 72

Metal Fabricators Corp. — 4-page two-color bulletin describes company's services for producing various special fabricated metal products to customer specifications.

Vacuum Spread Cooker 73

Mojonnier Bros. Co.—2-page bulletin No. 154 on vacuum fruit spread cooker used for production of marmalade, fruit butter and jelly. Table of specifications gives data on various models.

Ultrasonic Generators 74

Televised Products Co.—Bulletin No. 37 describes company's "Ultrason" generators and gives background study on ultrasonic energy. Two units described are for research and development. Model U-300 is a high powered research

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FREE HELPFUL LITERATURE
Send for Standard's Catalog. See how conveyors are used in every field of industry. Ask for Bulletin No. FI 68

Standard
GRAVITY & POWER
CONVEYORS

instrument for treating granular and liquid materials. Model U-100 is laboratory type unit for study and microscopic examination of effects of ultrasonics during period when energy is applied. Use of the instruments in the food field is exemplified.

Dust Collector System 75

Pulverizing Machinery Co.—Illustrated 4-page bulletin entitled "Optimum Recovery with the Mikro-Collector". Unit's dust-collecting features are detailed in text and illustration. Emphasis is placed on ability of equipment to handle damp dust loads. Filter rates, dimensions, weights and other data are covered.

Air-Motored Agitators 76

Eclipse Air Brush Co—4-page folder on "Pneumix", air-motored explosion-proof agitators. Seven types illustrated, described and priced. Also shown are nine types and sizes of propellers in bronze, aluminum, chrome plate or stainless steel.

Plant Supplies

Flavors and Chemicals 77

Florasynth Laboratories, Inc.—28-page catalog listing essential oils, aromatic chemicals, flavors and concentrates. Includes suggestions for use, also prices.

Heat Seal Labels 78

McLaurin-Jones Co.—6-page color folder pictures heat-seal labels. Varied uses in food field are shown.

Precipitated Carbonates 79

Industrial Chemical Sales Div., West Virginia Pulp & Paper Co.—48-page fully illustrated booklet, titled "Precipitated Calcium Carbonates —Their Manufacture, Properties and Applications", records outstanding data concerning these company products.

Flavor Tablets 80

Scientific Tablet Co. — 30-page bulletin describes and illustrates equipment and flavor tablets, listing tablet sizes and giving recommendations for various products and can sizes.

Steam-Detergent Cleaning 81

Oakite Products, Inc. — 8-page illustrated booklet on theory and applications of industrial steam-detergent cleaning. Supplies data on types of steam cleaning equipment, on specific detergents for use with such equipment, on preparation of working solutions, use of steam cleaning units for stripping oil-base paint, lacquer, enamel and other organic finishes from various surfaces.

Control Equipment

Microscope Instruction Booklet 82

Federal Mfg. & Engineering Corp.—24-page pocket size instruction booklet on operating and handling Model 40 standard size microscope.

Roll Surface Instruments 83

Foxboro Co.—Bulletin 405 on recorders and controllers illustrates typical installations for accurate measurement and control of roll surface temperatures of calenders, driers, and similar roll-type machines. Also described is new type measuring head which gives the equipment its high sensitivity. Continuous temperature measurement within 2 deg. is reported in operating ranges between —40 deg. F. and +350 deg. F., and at all ordinary operating speeds.

Laboratory Equipment 84

Scientific Glass Apparatus Co., Inc.—8-page bulletin No. 4, titled "What's New", illustrates and describes laboratory equipment. Price lists are included.

Control Instruments 85

The Brown Instrument Co.—Loose-leaf sheet No. 3.0-1, titled "Recording Thermometer for Food Locker Plants," shows installation layout and describes unit and its application. This is

one of a special series of releases by company on "Instrumentation Data."

Electric Motor Controls 86

Furnas Electric Co.—15-page catalog No. 48 describes and pictures company's line of electric motor controls. Engineering details, prices and specifications are listed.

Combustion Safeguard 87

Wheelco Instruments Co.—12-page two-color bulletin No. Fl-1 contains photos, wiring diagrams and descriptions of company's Flameotrol combustion safeguard systems. Presented are listings of models with recommendations for application, sensing units for gas and oil operation and explanation of new "Blue Sensitive Cell" and "Safe Start Relay".

Canning Controls 88

The Foxboro Co.—48-page Bulletin 414 gives complete presentation of instruments and related equipment for canning industry. Diagrammatic sketches cover most of standard applications of instruments for measurement and control in canning operations. Each sketch is accompanied by a typical installation photo and a list of advantages to be gained by correct instrumentation. Also shown are valves and accessory equipment, with dimensions and specifications.

Materials Handling

Refrigerator Truck Bodies 89

Hackney Bros. Body Co.—4-page pamphlet gives standard body dimensions and capacities of company's trucks, as well as construction features and details.

Milk Truck Bodies 90

Millington Truck Body Co.—4-page pamphlet describes and illustrates company's milk truck bodies. Construction details and special features covered.

Conveyor Belting 91

The B. F. Goodrich Co.—New catalog section No. 2220 is guide to proper selection of conveyor belt grades. Section explains yardsticks employed in belt engineering to differentiate grades, also pictures and describes conveyor belts in company line, citing common application for each. One page is devoted to special constructions, obtainable in various grades..

Industrial Vacuum Uses 92

Spencer Turbine Co.—20-page bulletin concerns various uses of vacuum in industry. Range includes removal of liquids, gases and dusts, and uses of vacuum as a conveyor of materials with capacities up to 4 tons per hour.

Hand Trucks 93

The Rapids-Standard Co. Inc.—2-page illustrated pamphlet describes company's hand trucks and gives specifications.

Miscellaneous

Work Uniforms 94

E. R. Moore Co.—8-page illustrated booklet on women's work clothes and uniforms. Tailoring and fabrics are described.

Scale Models 95

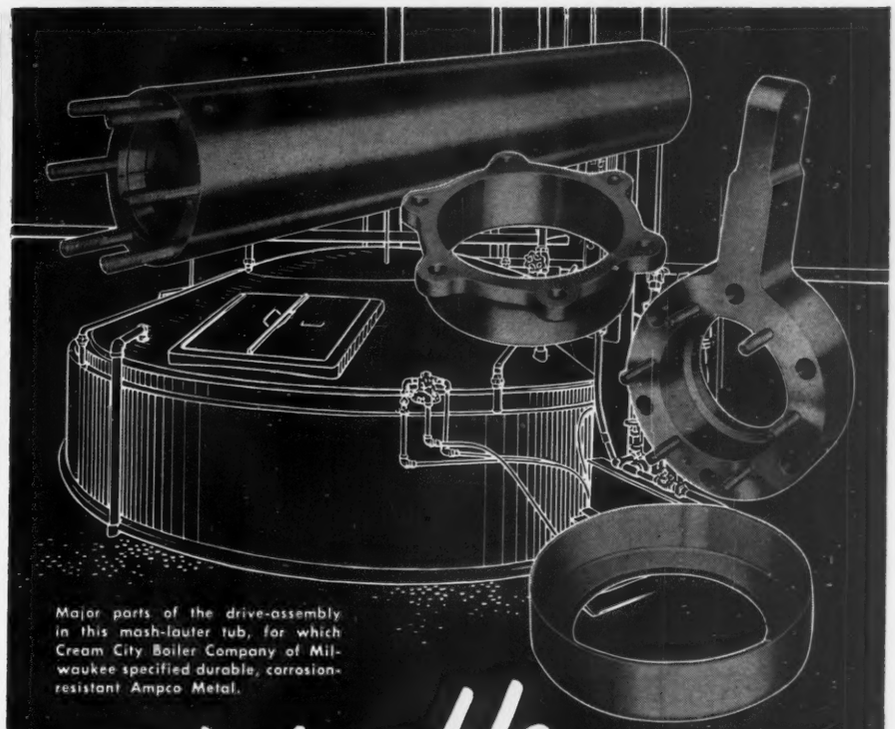
Industrial Models—2-page sheet on miniature replicas for industrial plants. Models are accurate reproductions built from blueprints or flowsheets. Used as visualization tools. Costs are given.

Whistles 96

Leslie Co.—Bulletin No. 466 is 12-page booklet titled "Engineering, Operating and Maintenance Data on Leslie-Tyfon Whistles and Signals." Units for regular industrial purposes, also intra-plant and department signals are described. Design, operation, installation and maintenance are covered in detail.

Standard Buildings 97

Luria Engineering Corp. — 12-page bulletin lists specifications, design, materials, and instructions for ordering standard type buildings fabricated by this company.



Major parts of the drive-assembly in this mash-lauter tub, for which Cream City Boiler Company of Milwaukee specified durable, corrosion-resistant Ampco Metal.

Tub trouble is just a bubble

—when Ampco Metal is on the job

That's why corrosion- and wear-resistant Ampco Metal is used for bearings and other critical parts in this mash and lauter tub

Critical parts made of Ampco Metal are an assurance of *long and trouble-free service, low maintenance and replacement costs.* Ampco Metal gives you many important qualities not found in other anti-acid metals: High tensile strength; good ductility; less weight; hardness to resist squashing, wear, impact, and fatigue; good bearing qualities. Ampco's aluminum bronze also resists corrosion, erosion, and cavitation—successfully handles such liquids as acids, alkaline solutions, sea water, mine waters, petroleum sludge, hot brine, and food-product liquors. Whatever your process problem may be, get in touch with us. Our engineers can save you time and money by helping you adapt Ampco Metal, or assemblies of Ampco Metal and alloys, to your requirements.

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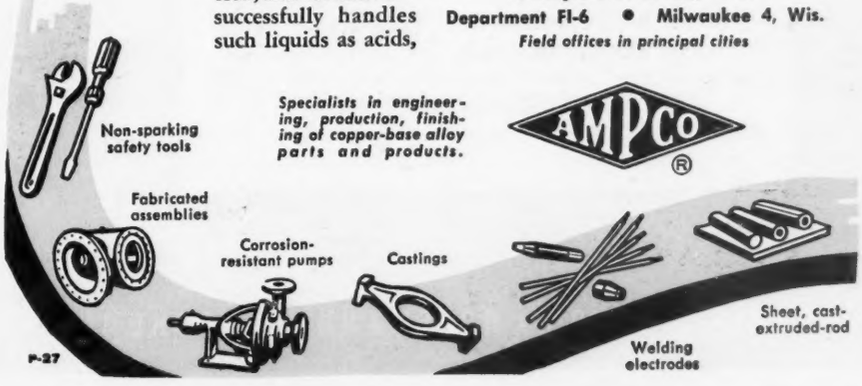
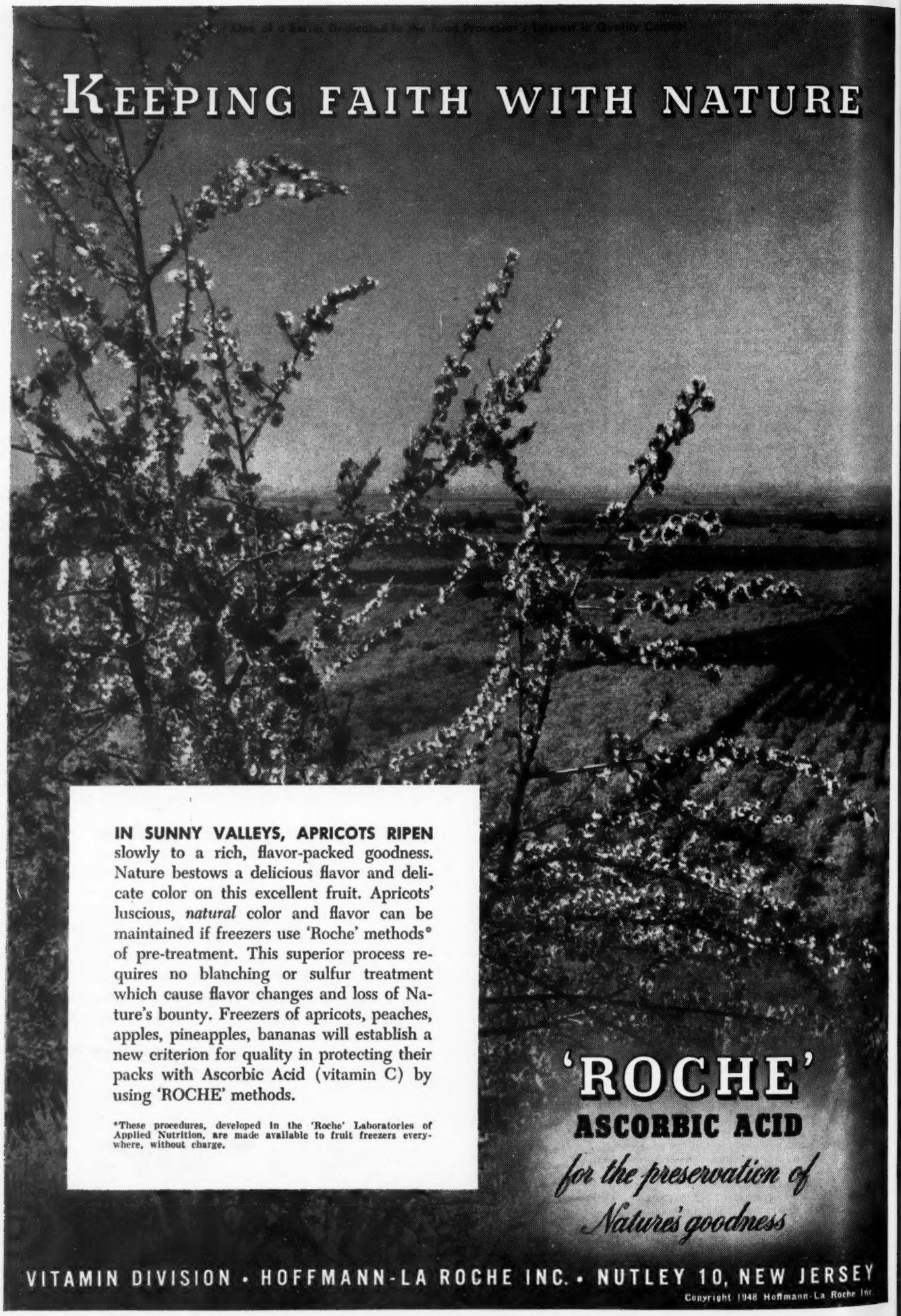


One of a Series Dedicated to the Food Processor's Interest in Quality Control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IN SUNNY VALLEYS, APRICOTS RIPEN slowly to a rich, flavor-packed goodness. Nature bestows a delicious flavor and delicate color on this excellent fruit. Apricots' luscious, *natural* color and flavor can be maintained if freezers use 'Roche' methods* of pre-treatment. This superior process requires no blanching or sulfur treatment which cause flavor changes and loss of Nature's bounty. Freezers of apricots, peaches, apples, pineapples, bananas will establish a new criterion for quality in protecting their packs with Ascorbic Acid (vitamin C) by using 'ROCHE' methods.
*These procedures, developed in the 'Roche' Laboratories of Applied Nutrition, are made available to fruit freezers everywhere, without charge.
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FOOD TECHNOLOGY
NEW DISCOVERIES AND INVENTIONS

PACKAGING

Stored Dehydrated Meat

DEHYDRATED beef and pork survives storage equally well in hot-dipped tin-plate cans, fused electrolytic plate cans and "Bonderized" cans. Samples packed in air, vacuum and nitrogen, were stored at 135, 110, 70-90, and 36-38 deg. F. Peroxide value reached a maximum depending on the temperature of storage, and then declined to zero, while free fatty acid increased slowly during a year of storage.

Taste tests showed that in 2 weeks at 135 deg. F. the meat acquired a cured flavor which changed to an unpalatable scorched flavor at the end of 6 months. At 110 deg. the cured flavor appeared after 6-8 weeks, and was retained for a year. At room temperature there was little change beyond a yellowing of the fat, and a flavor intermediate between that of fresh and cured meat. Under refrigeration the samples maintained this initial condition of flavor and color.

Non-metallic and metal foil packages of several types were tested. Most of them failed because of fat soluble sealing and laminating materials which caused the packages to come apart during handling, especially at elevated temperatures. Others were too easily damaged and torn in handling. The best package was one of metal foil laminated to cellophane. When protected from abuse and damage this was a satisfactory container for dehydrated pork.

Digest from "Packaging Dehydrated Meat", by R. A. Whitmore, D. Seligson, H. R. Kraybill, and B. H. Webb, **Food Research**, vol. 13, 19-28, Jan.-Feb., 1948.

CEREAL PRODUCTS

Cereal-Soya Product

A PRECOOKED cereal product, in the form of toasted flakes of high protein content, that are strong, large in size and do not absorb large quantities of milk or cream, is the object of a recently patented process.

In the process, finely ground soya bean flour, containing not over 15 percent oil, is mixed with cereal grain particles of a size not smaller than 12 mesh. The mixture is then cooked, formed into flakes and toasted. Suggested proportions of cereals to flour are: 60 percent cracked cereal grains to 40 percent soya bean flour. These proportions may be varied somewhat depending upon the particular cereal: Wheat, rice, corn, rye, oats or barley.

Digest from U. S. Patent 2,436,519, issued Feb. 24, 1948, on an application dated Oct. 11, 1943, to C. E. Luke, Irwin, Pa., and assigned to General Foods Corp., New York.

CANNING

Lima Bean Quality

DEVELOPMENT of new varieties of lima beans has necessitated establishment of a method other than color for testing the maturity of both raw beans and the canned product. Hence an investigation has been made into 3 factors of quality—color, size and maturity. Recommended sizes were prepared by screening. Maturity was measured by determining percent of alcohol insoluble solids. Color was studied by spectrophotometer and disc colorimeter. Hardness was measured by the tenderometer.

From the grower's viewpoint, lima beans should be harvested at an early stage of maturity, which can be measured by the percent of seeds that have turned white or by the tenderometer which may serve as an index of maturity for both white and green seeded varieties. Maximum yield stage, when the largest portion of the beans in the field are at their maximum size, differs for different varieties. This point is reached by Henderson bush when 40 percent of the beans have turned white and the tenderometer reading is about 300. For Peerless, 35 percent white and tenderometer reading of about 210.

In harvesting and processing, the time elapsed between vining and blanching should be held to a minimum, as well as time and temperature of blanching, to avoid loss of nutritive value. Guesswork on the fill-in weight can be eliminated by a knowledge of tenderometer readings on raw beans. At a tenderometer reading of 80, lima beans do not swell at all. For every increase of 10 lb. in the tenderometer reading, the drained weight may be expected to exceed the fill-in weight by one percent. Methods used in the investigation are given in detail, and results are set forth in 19 tables.

Digest from "Effect of Variety, Maturity and Canning Procedures on Quality and Nutritive Value of Lima Beans," by A. Kramer and H. R. Smith, **Bulletin A47**, University of Maryland Agricultural Experiment Station, College Park, Md., August, 1947.

VITAMINS

Thiamine in Cereals

CLOSE relationship has been found between thiamine content and fat content in many cereals, particularly barley. In oat bran, also, high thiamine content is accompanied by high fat content, and the pericarp of wheat and of rye is low in both thiamine and fat. Fat content may, therefore, be used as an index for thiamine content.

Heavy scouring of barley products may cause the loss of substantial amounts of thiamine. In the case

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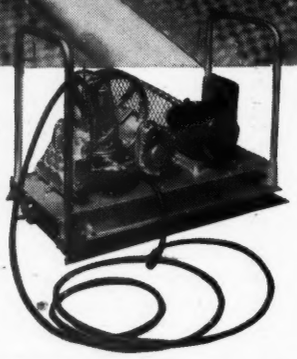

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of wheat and rye, however, scouring may be used in processing without significant loss of the natural vitamin.

Digest from "Thiamine Distribution in Wheat, Rye, Barley and Oats", by L. H. Pulkki and K. Puutula, Cereal Chemistry, vol. 24, no. 5, 337-345, Sept., 1947.

FRUIT PRODUCTS

Re Germicidal Effect of SO_2 in Fruit Juices

SULPHUR DIOXIDE that is combined with sugars, aldehydes and other substances in fruit juice is not effective as an antiseptic for the juice. By adding sodium sulphite in equal amounts to dextrose solution of 4-40 percent concentrations, media of equal total SO_2, but quite varying free SO_2 content, were obtained. When these were inoculated with equal numbers of Zygosaccharomyces cells, no correlation between growth and total SO_2 could be obtained. There was an apparent correlation between plate count of yeast after incubation and free SO_2 as measured by iodine titration.

The experiments indicated that in the relatively simple dextrose medium used, 10 ppm. of free SO_2 had a highly lethal effect. There was evidence of SO_2-resistant cells in the inoculum since some fermentations had high counts at the same SO_2 level. In orange juice concentrates, however, 50 ppm. SO_2 permitted growth, though slowly. This indicates that in such juices there are loose combinations with SO_2 that inhibit yeast growth but are easily enough broken so that iodine titration shows them as free. Possibly pectin and cellulose form such combinations.

Digest from "The Germicidal Effects of Free and Combined Sulphur Dioxide," by M. Ingram, Journal of the Society of Chemical Industry, vol. 67, 18-21, January, 1948.

BAKING

Effect of Soy Flour On Cake Staling

SOY FLOUR has been suggested as an agent for retarding the staling of bakery products. To test its effectiveness in cake, 15 percent soy flour of high-fat, low-fat and minimum-fat types was added to cake-flour,

(*Continued on page* 186)

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and standard cakes containing sugar, hydrogenated fat, egg and milk, were baked and tested for staleness after 24, 48 and 96 hr.

Compressibility of the crumb was used as an objective test and indicated a difference between cakes 3 and 24 hr. old. There was no significant difference, however, between 24, 48 or 96 hr., nor between cakes made with the control cake flour and those with any of the three types of soy-flour added. When cakes were judged subjectively for freshness, tenderness, grain, texture, color, moistness and general desirability, significant differences appeared for each type of flour. When scored for freshness all were scored equally after 3 hr., but after 24 hr. the all cake-flour product was rated fresher than the minimum-fat soy flour cake. After 72 hr. the high-fat soy flour cake was rated fresher than the minimum-fat sample. No consistent pattern of staling could be discerned, though most of the judges felt that the soy flour gave disappointing results, organoleptically.

Ink imprints of slices of the cakes, made 3, 24, 48, 72 and 96 hours after baking, indicated that, starting from very similar grain the cakes containing soy flour were noticeably coarser after 96 hr. than the cake flour standard.

Digest from "Effect of Soy Flours on Rate of Staling in Plain Cake," by L. B. Powers and J. I. Simpson, Food Research, vol. 12, 449-60, Nov.-Dec., 1947.

SUGARS

Maltose Sirup Made From Wheat Flour

BLAND maltose sirup, that is clear and light in color, may be prepared from granular wheat flour. For the process to be practical, however, the flour must be extracted with water to remove soluble protein before conversion. The manufacture comprises 4 distinct steps: (a) cooking the grain to render the starch accessible to the conversion agent; (b) converting the starch to maltose and glucose by means of an amylase containing agent; (c) clarifying the mash, and (d) refining and concentrating the thin liquor to produce sirup. In the experiments, several conversion agents were tested and various processing techniques were investigated in an effort to improve filtration rate. In filtering the sirup, carbon served to reduce the color and bentonite the protein. Malt-converted granular wheat flour yielded a clear light-golden sirup of pleasant

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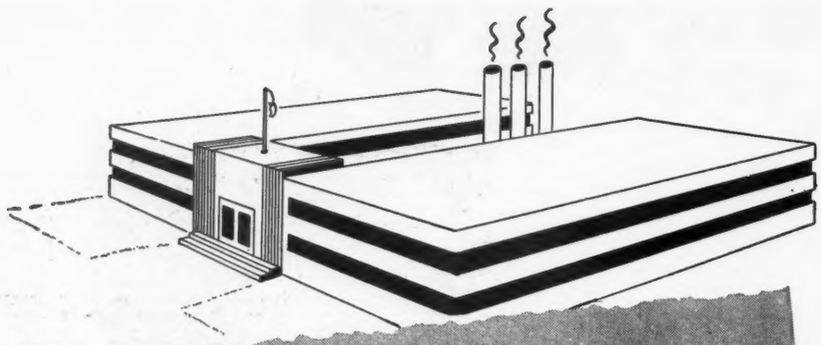

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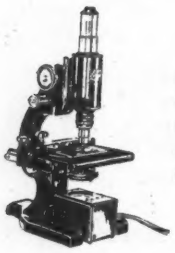

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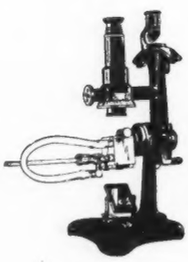

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taste, containing about 0.6 percent protein and 0.7 percent ash. Wheat flour converted with filtered fungal amylase liquor yielded a slightly darker sirup with a stronger flavor, containing less than 1 percent protein and ash. Mold bran fungal amylase liquor yielded a dark, cloudy sirup of pleasant flavor containing 4 percent protein and 1 percent ash.

Digest from "Production of Maltose Sirups from Granular Wheat Flour," by A. Efron and R. H. Blom, **Industrial and Engineering Chemistry**, vol. 40, 412-15, March, 1948.

MICROBIOLOGY

Vanillic Acid Esters For Spore Control

ISOBUTYL vanillate is effective as an inhibitor of spore forming bacteria in dairy products, and is no more toxic than sodium benzoate. Its flavor makes milk unacceptable for human consumption, however.

Observations were made on the effect of ethyl, n-propyl, n-butyl and isobutyl vanillates on cultures of milk containing 100,000 spores per ml., stored at 86, 98.6 and 125.6 deg. F. At 0.15 percent concentration of isobutyl vanillate samples remained unchanged over a period of 3-4 months. N-butyl was less effective, especially against *Cl. botulinum* and *Cl. perfringens,* and ethyl vanillate rarely prevented growth.

Digest from "Esters of Vanillic Acid as Spore-Controlling Agents", by F. R. Evans and H. R. Curran, **Food Research**, vol. 13, 66-69, Jan.-Feb., 1948.

Bacteria in Eggs

COLIFORM bacteria occur in all forms of liquid eggs that have been examined, including eggs broken under laboratory conditions. They have their source in the shells, equipment used in breaking, egg handlers and the general sanitary conditions of the breaking plant, and not in the egg contents. The presence of coliforms is a measure of sanitation in the egg-breaking plant, but is not a reliable index of pasteurization efficiency, since some types of Salmonella will survive conditions that destroy coliform bacteria.

In a series of 134 samples of fresh laboratory-broken low-grade, cracked and dirty eggs, the standard plate and coliform counts averaged 360 and 11 thousands, respectively. For fresh commercial eggs the counts were 2,718 and 61 thousands;

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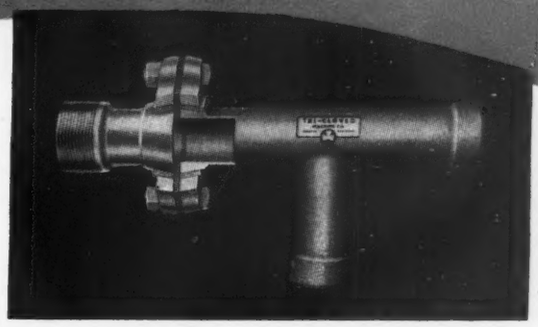

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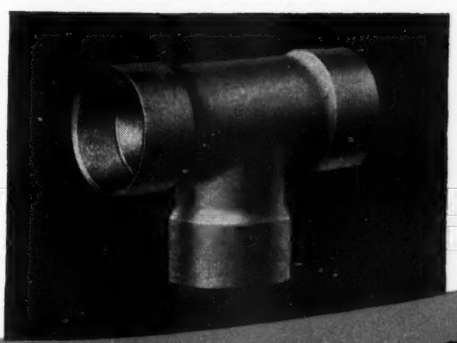

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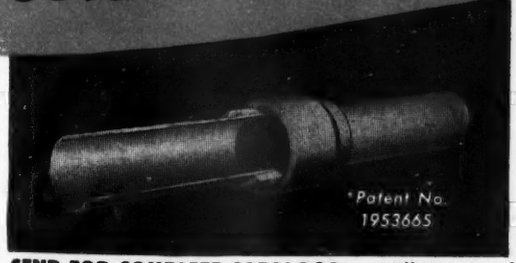

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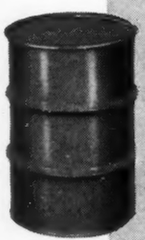

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for frozen eggs, 3,304 and 6 thousands; for defrosted eggs, 15,813, and 235 thousands. All samples tested but one, could be pasteurized with total destruction of coliform bacteria. The resistant organism proved to be *Aerobacter aerogenes*. Temperatures of 146 deg. F. for ½ min., 144 deg. for 1 min., 142 deg. for 1½ min. and 140 deg. for 2½ min., sufficed for pasteurization.

Digest from "Pasteurization of Liquid-Egg Products IV. Destruction of Coliforms", by A. R. Winter, G. F. Stewart, and M. Wilkin, **Food Research**, vol. 13, 11-17, Jan.-Feb., 1948.

MEATS

Conductivity in Tissues of Lard and Fatty Meat

HEAT flow through lean and fatty meat tissues at room to low temperatures has been measured by clamping 1-in. slabs of meat between hot and cold plates. The slabs were 12 in. square, and were made up of strips of horse meat for the lean sample, and whale blubber for the fatty tissue. The lean meat contained 70 percent water and was cut along the fibers so that the conductivity applies to heat flow across the fibers.

Between 95 and 77 deg. F. the lean meat sample had a thermal conductivity of 3.2 B.t.u./sq.ft./hr./in./deg. F. of temperature difference. Thermal conductivity of the whale blubber was about half that of lean meat, 1.5 B.t.u. in the temperature interval 95-32 deg. F.

Digest from "Thermal Properties of Meat" by E. Griffiths and D. H. Cole, **Journal of the Society of Chemical Industry**, vol. 67, 33, January, 1948.

QUALITY CONTROL

Sedimentation Test For Baking Quality

BREAD-BAKING quality of flour can be estimated by a quick sedimentation test of the solid phase of an acidulated suspension of the flour in water. Tests, conducted on 135 samples of different types of hard red wheat, show the sedimentation value to be as accurate an index to bread loaf volume as is protein content. Chiefkan and Red Chief wheat flours are properly evaluated, with respect to loaf volume, by the sedimentation test though often greatly overestimated by protein content determinations. Rapid settling of the solid phase of the suspension indi-

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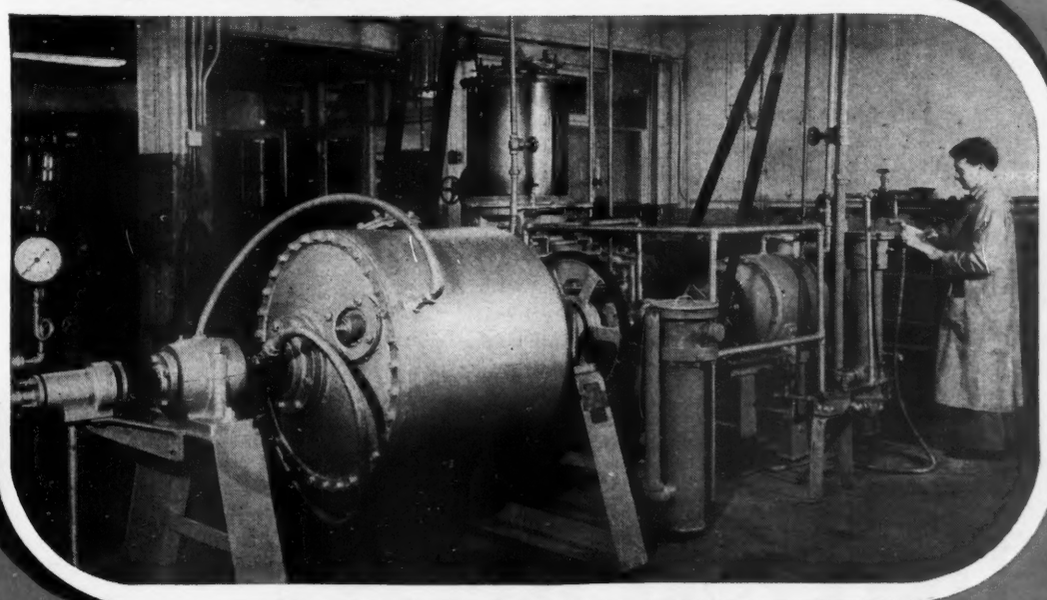

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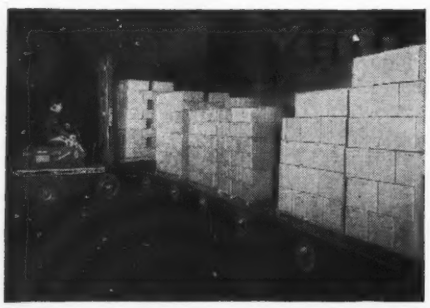

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cates poor bread-baking and gluten quality. Conversely, slow settling is observed to be associated with high protein content, good bread baking and gluten quality.

Digest from "A Simple Sedimentation Test for Estimating the Bread-Baking and Gluten Qualities of Wheat Flour", by L. Zeleny, **Cereal Chemistry**, vol. 24, no. 6, 465-475, Nov., 1947.

Peroxidase Activity

DETERMINATION of peroxidase activity in malt and barley may be accomplished by a method using o-phenylenediamine as a substrate. With hydrogen peroxide and the enzyme present, o-phenylenediamine is changed to an orange-colored compound which can be determined colorimetrically or fluorometrically. The reaction rate is linear with time for the first few minutes, lessening noticeably after 5 min. The optimum temperature for o-phenylenediamine peroxidase reaction is about 95 deg. F. Since peroxidase is fairly heat-stable, this relatively low temperature must be due to a poisoning effect of the substrate on the enzyme.

Peroxidase activity may be determined also by a modification of the Willstatter pyrogallol method. Close correlation exists between o-phenylenediamine and pyrogallol peroxidase activity, indicating that a single enzyme is responsible for both. Pyrogallol peroxidase activity is highest at pH of 6.4 and o-phenylenediamine at pH of 4.6.

Digest from "Oxidizing Enzymes in Brewing Materials II Peroxidase in Malt and Barley", by J. S. Wallerstein, M. G. Hale and R. T. Alba, **Wallerstein Laboratories Communications**, 17-26, March, 1948.

MISCELLANEOUS

Flavors in Poultry Meat

ACCIDENTAL discovery that chickens absorb and retain the odor and taste of benzene hexachloride led to conclusive tests at the University of Nebraska. Four chicken houses were selected. In one house 5 birds were fed for a week on a mixture of one part benzene hexachloride containing 6 percent of the gamma isomer in 200 parts of a mash-grain feed. and then changed to the standard ration received by the other lots. In the second house 5 birds were sprayed until wet with a benzene hexachloride suspension containing 0.25 percent of the gamma isomer. In the third, the walls were sprayed with the same suspension and allowed to dry before birds were placed therein. The fourth, or control house, was isolated, and con-

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tained 5 untreated birds. At 2-, 4-, 6-, and 10-week intervals one bird from each lot was killed, cooled, and after 24 hours roasted without salt or condiment. Five tasters then checked each bird for odor and taste, recording their reactions according to a pre-arranged scale. All birds that had been in contact with benzene hexachloride in any manner showed disagreeable taste and odor that persisted for the 10-week period, in marked contrast to the birds in the control house.

Digest from "Effect of Benzene Hexachloride on the Flavor of Poultry Meat," by E. Hixson and M. H. Muma, Science, vol. 106, 422-3, October 31, 1947.

Non-Bloom Chocolate

CHOCOLATE coatings that will resist softening and reduce blooming under the influence of heat are the objects of a recently patented invention. According to the invention, the edible product is coated with chocolate of the ordinary commercial type and in the usual way. While this primary coating is in the melted condition a low-fat edible solid material is applied by dusting, spraying or sieving. After this material is applied, the chocolate coated product is cooled in the usual manner. The dry material may consist of cocoa, sugar, milk solids and mixtures thereof. It is applied in the ratio of 50 lb. dry material to 100 lb. primary chocolate coating.

Digest from U. S. Patent 2,434,987, issued Jan. 27, 1948, on an application dated July 20, 1945, to H. R. Burbank, New York, and B. J. Zenlea, Ozone Park, N. Y., and assigned to Rockwood & Co., Brooklyn, N. Y.

DDT Residues

INSECTICIDE formulations containing DDT, applied to field crops during the growing season, generally result in residues which persist until the crop is harvested. When forage crops containing large amounts of DDT residue are fed to farm animals, DDT may be stored in the tissue and eliminated in the milk. It appears that DDT present as residues on vegetation is chemically unchanged when stored in animal fat and tissue and eliminated in milk. since extracted residues of these materials subjected to colorimetric tests gave the characteristic blue color obtained by treatment of DDT. The organic chlorine content of aliquot portions of these extracted residues was in good agreement with the amounts calculated from the DDT content obtained colorimetrically.

Digest from "DDT Residues in Agricultural Products," by R. H. Carter, Industrial and Engineering Chemistry, vol. 40, 716-17, April, 1948.

BOOKS

Bibliography

LITERATURE SEARCH ON THE SOLVENT EXTRACTION OF OLEAGINOUS MATERIALS. By B. H. Weil, Marjorie Bolen and Nathan Sugarman. Published by State Engineering Experiment Station, Georgia School of Technology, Atlanta, Ga., 1948. 185 pages; 8¾ x 5½ in.; cloth. Price, $4.

This literature search is concerned primarily with a listing of references on the extraction of oils from oilseeds. The references deal with the preparation of the seeds for extraction, solvents used, processes and apparatus involved, methods of separation of the various constitutents following extraction, and uses of by-products.

Emphasis is placed on peanut oil extraction, and the resulting by-products, but all available references on other oilseeds, such as cottonseeds and soybeans, are cited. There is no claim that this search is exhaustive, but the book does offer an expanded bibliography of the pertinent literature on these subjects.

The authors are, respectively, chief of technical information service, research assistant and research assistant professor, at the Georgia station. The preparation of the book is part of a program of organizing and making readily available information in the literature.

Food Freezing

THE PRESERVATION OF FRUIT AND VEGETABLES BY FREEZING. By T. N. Morris, J. Barker and R. Gane. Published by His Majesty's Stationery Office, York House, Kingsway, London, W. C. 2, 12 pages; 9½ x 6 in.; paper. Price 4d.

This is an interesting little treatise that holds a great deal of useful information on the freezing of fruits and vegetables. Prepared from studies made by the British Food Investigation Organization of the Department of Scientific and Industrial Research, it outlines the various processes and defines the results.

Raw Material

COTTONSEED AND COTTONSEED PRODUCTS. Edited by Alton E. Bailey. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y., 1948. 936 pages; 9¼ x 6 in.; cloth. Price, $17.50.

Here is a comprehensive treatise on the chemistry and technology of the cottonseed industry that should be of value to the layman interested in the subject, as well as to the scientist.

Chapters on the various aspects of this broad field have been prepared by specialists. This authoritative approach permits discussion of the utilization, as well as the production, of cottonseed products. Attention has been given also to such historical, economic and agronomic factors as have influenced present day technology.

The book will serve, therefore, as a text and reference book for students and for industrial workers, and management engaged in processes involving cottonseed.

Plant Studies

GROWTH OF PLANTS. By William E. Crocker. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y., 1948. 459 pages; 9¼ x 6 in.; cloth. Price, $10.

Though the subject of this book is rather remote as a related study for the food processor, it is nevertheless of value to those who must look to plant life for their raw materials. The volume provides a critical summary of the basic researches carried on at the Boyce Thompson Institute for Plant Research, Yonkers, N. Y. Its chapters run the gamut of plant studies, from seeds and buds to such subjects as factors for color in the production of potato chips, and research on insecticides and fungicides.

GOVERNMENT PUBLICATIONS

The following recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the bureau responsible for its issue.

VITAMIN AND MINERAL CONTENT OF CERTAIN FOODS AS AFFECTED BY HOME PREPARATION. By Elizabeth M. Hewston, et al. Department of Agriculture, Miscellaneous Publication No. 628. Price 30 cents. Valuable as market guide for those selling feeds that are by-products of food industry and those interested in vitamin and mineral food ingredients.

ANIMAL UNITS OF LIVESTOCK FED ANNUALLY, 1919-20 to 1946-47. By R. D.

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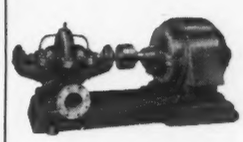

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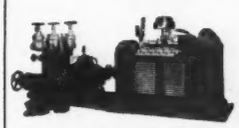

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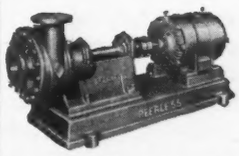

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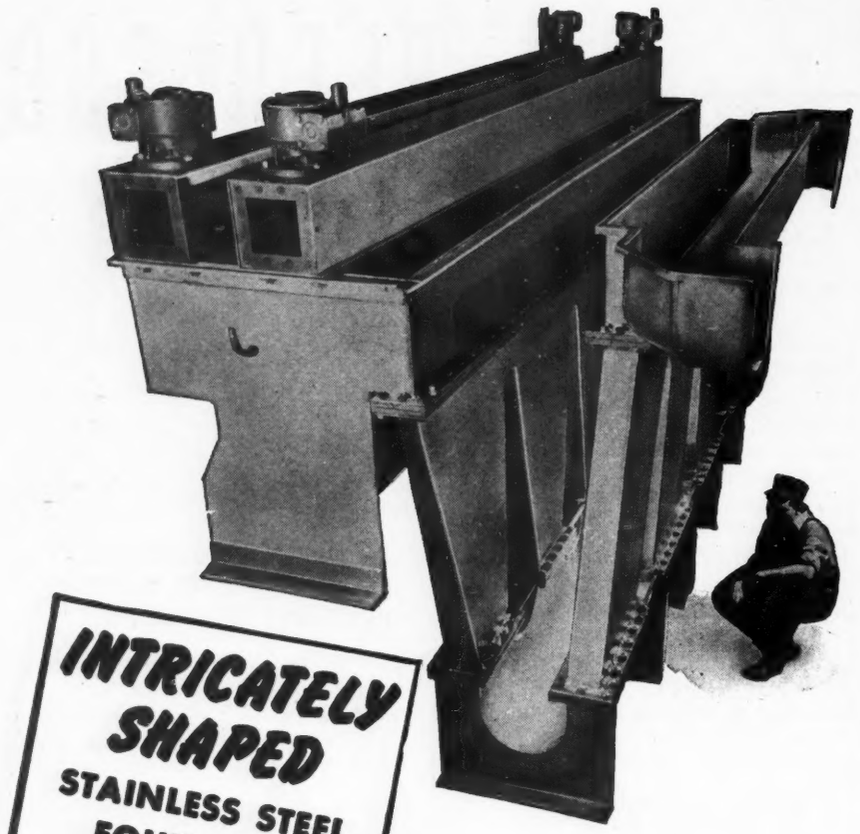

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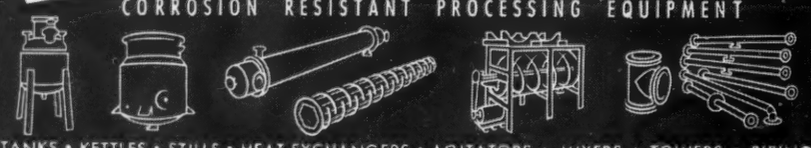

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Jennings. Bureau of Agricultural Economics, F.M.64. Indicates magnitude and trend in animal-feed markets. Processed.

RATIONS FED TO MILK COWS. By John L. Wilson. Bureau of Agricultural Economics. Unnumbered, mimeographed. Highly detailed statistical report important for both feed and dairy products industries.

Forecasts of the Population of the United States, 1945-1975. Bureau of the Census. Price 45 cents. A basic guide to future market possibilities. Should be particularly useful in food distribution.

CONSUMERS' GUIDE TO U. S. STANDARDS FOR FARM PRODUCTS. U. S. Department of Agriculture, Miscellaneous Publication No. 553. Revised in 1947, published in 1948. Price 15 cents. Guide to U. S. standards for meats, turkeys, eggs, butter, cheese, processed and fresh fruits and vegetables, dry beans and peas, rice and honey.

SMALL BUSINESS AND GOVERNMENT LICENSES. U. S. Department of Commerce, Economic (Small Business) Series No. 66. Price 15 cents. Reviews government licenses, which are an important factor in the establishment of many small businesses.

HOURS OF WORK AND OUTPUT. Bureau of Labor Statistics, Bulletin No. 917. Price 35 cents. A general summary of productivity in different divisions of industry as affected by the length of the work week. General section followed by 78 case studies in a few of which food industry is involved.

DISTRIBUTION OF THE VARIETIES AND CLASSES OF WHEAT IN THE UNITED STATES IN 1944. By J. Allen Clark and K. S. Quisenberry. Department of Agriculture, Circular 761. Price 20 cents. Varietal surveys furnish a historical record of the shifting of varieties and form a basis for further wheat improvement.

POULTRY AND EGGS. Food and Agriculture Organization Commodity Series No. 5. Available only from Food and Agriculture Organization of the United Nations, 1201 Connecticut Avenue, Washington 6, D. C. Price 25 cents. Includes discussion of current situation and outlook, chicken population, production and consumption data, and international trade in eggs, all supplemented by elaborate statistical tables giving a world view.

FEDERAL SPECIFICATIONS INDEX. Bureau of Federal Supply, Federal Standard Stock Catalog, Section IV, Part 1. Price 35 cents. Lists by title and number general government food specifications, but does not include those used by single departments like military agencies, nor include temporary or preliminary specifications not yet approved for general government use.

PATENTS

Glyceride Oils Bleached and Hardened by Hydrogenating under Pressure in Presence of Small Quantity of Coprecipitated Catalyst Consisting of Copper, Silver, or Gold and Iron and Nickel, Cobalt, Palladium or Platinum—Wm. J. Paterson, Newton Highlands, Mass., to Lever Brothers Co. No. 2,437,705, Mar. 16, 1948.

Glyceride Oils Bleached by Hydrogenation under Pressure in Presence of Coprecipitated Catalyst Containing Iron and Copper, Silver or Gold—Wm. J. Paterson, Newton Highlands, Mass., to Lever Bros. Co., Cambridge, Mass. No. 2,437,706. Mar. 16, 1948.

Frozen Grapefruit Pulp Stabilized against Development of Off-Flavor by Treating Pulp with Alkyl Esters of Caffeic Acid, Hydrocaffeic Acid or Alkyl Esters of Hydrocaffeic Acid before Freezing—J. T. R. Nickerson, Wakefield, Mass., to General Foods Corp., New York. No. 2,437,752. Mar. 16, 1948.

Fresh Green Vegetables Subjected to Vigorous Spray of Salt Solution for 25 to 60 sec. at between 100 and 130 deg. F., Drained and Exposed for less than 5 min. to Steam Temperature of 190 to 210 deg. F. Preliminary to Rapid Cooling and Subsequent Freezing—O. L. Moulthrop, Selma, Calif., to Western Frozen Foods Co., Fresno, Calif. No. 2,437,859. Mar. 16, 1948.

Tomatoes Immersed in 60 percent Solution Calcium Chloride at 280 deg. F. for 15 to 60 sec. for Removal of Skin—D. Childs, A. E. Braun and J. Hanson, Sunnyvale, Calif., to Libby, McNeill & Libby, Chicago, Ill. No. 2,437,937. Mar. 16, 1948.

Cut Fruit Mechanically Distributed in rows on Drying Trays—N. E. Gaddini, Winters, Calif. No. 2,437,950. Mar. 16, 1948.

Stable Dextrose Syrup made from Commercial Wheat Flour—J. M. Brown, Melrose, W. A. Bemis, West Medford and F. A. Monroe, Jr., Melrose, Mass., to Revere Sugar Refinery, Charlestown, Mass. No. 2,438,033. Mar. 16, 1948.

Milk and Nutrient Minerals Fermented by Aspergillus niger to produce Citric Acid—J. Szucs, Yonkers, N. Y. No. 2,438,136. March. 23, 1948.

Shell Eggs Coated with Emulsion of Several Waxes of Different Melting Points in Water to Inhibit Storage Deterioration; Waxes Treated with Ultraviolet—W. R. Hearst and G. M. Hearst, San Francisco, Calif. No. 2,438,168. Mar. 23, 1948.

Cholic Acid Isolated from Bile—R. H. Sifferd, Hollywood, Ill., to Armour & Co., Chicago, Ill. No. 2,438,232. Mar. 23, 1948.

Lactic Acid added to Starch Conversion Syrup and Spray-Dried to Moisture Content not in Excess of 4 percent of Weight of Dry Product—H. H. Schopmeyer, Hammond, Ind., to American Maize-Products Co. No. 2,438,326. Mar. 23, 1948.

Chewing Gum Base Made to Contain Stabilized Glyceryl Rosin Ester and Alkyl Cellulose—E. P. Fenimore, Drexel Hill, Pa., to Bowman Gum, Inc., Philadelphia, Pa. No. 2,438,551. Mar. 30, 1948.

Fat-Soluble Vitamins Recovered from Fish Liver Oils and Fish Livers by Alkali Saponification using Alcohol Solution of Mixed Alkali Metal Hydroxide and Alkali Metal Sulfide.—L. Freedman, Mt. Vernon, N. Y. No. 2,438,554. Mar. 30, 1948.

Eggs Mechanically Washed and Dried in Conveyor Units—G. F. Hodson, Atlus, Okla. No. 2,438,666. Mar. 30, 1948.

Bread Dough Mechanically Shaped into Loaf Form and Panned—G. N. Le Sage, Kansas City, Mo. No. 2,438,811. Mar. 30, 1948.

Sweet Potato Starch Modified for use as Gelling Agent by Treating with Formaldehyde and Subsequently with Sodium Bisulfite—R. W. Kerr, Riverside and N. F. Schink, Oak Park, Ill., to Corn Products Refining Co., New York. No. 2,438,855. Mar. 30, 1948.

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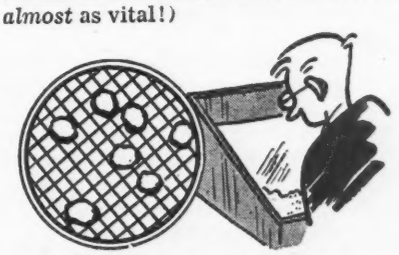

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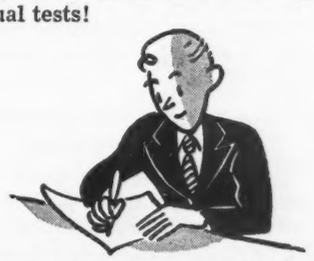

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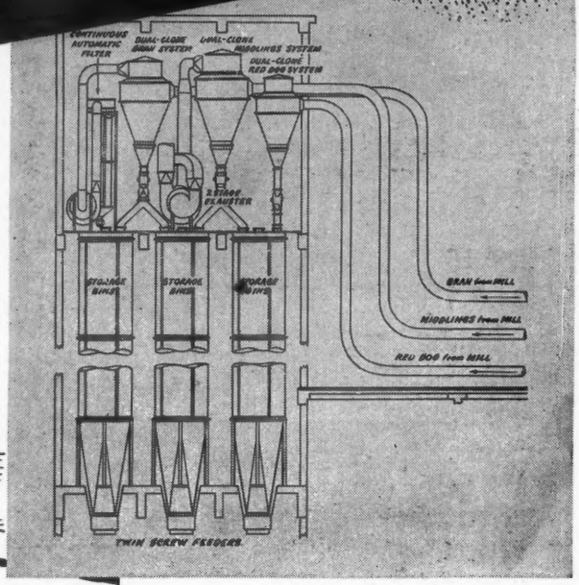

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Correction

IN the article in the April issue on California wine production, the use of enzyme was discussed for increasing the yield of free run juice. An error crept into one reference to this procedure. The running title on page 90 should have read "Addition of Pectic Enzyme Increases Yield of Free Run". The phrase "Peptic Enzyme" was, of course, incorrect, and doubtless left readers more amused than confused. The article stated correctly that "The addition of six to eight pounds of commercial pectic enzyme per ton increases the yield of free run and facilitates pressing".

Frozen Food Research

(*Continued from page* 100)

the tissues are subjected to various freezing and storage temperatures, and the determination of the extent to which freezing alters the structure and properties of such tissue.

It has been generally accepted that when cells are subjected to temperatures below the freezing point of any of the cell constituents, ice formation begins rather promptly in the intercellular spaces. It begins there rather than within the cells because the osmotically held water within the cells has a lower freezing point, due to the materials this water carries in solution. If the temperature is lowered slowly, more water is withdrawn from the cells into the intercellular spaces where it is promptly frozen and increases the ice mass. As this process goes on, the cell sap becomes a more concentrated solution, and its freezing point is progressively lowered.

Continued lowering of temperature builds up larger and larger masses of ice crystals in the intercellular spaces and results in extreme concentrations of the cell sap, which ordinarily does not freeze. Furthermore, a part of the colloidally-held water within the cells is withdrawn into the intercellular spaces, resulting in a greater concentration of the cell colloids. Slow freezing is thus seen to involve a dehydration of the cells and their collapse.

When freezing is very rapid, there is not sufficient time for the withdrawal of much water from the cells. If the percentages of the total water held in the tissue as free, osmotically-bound, and colloidally-bound

water in one food product are 10, 50 and 40, respectively, the problems of freezing, holding the temperature, and freezing rate are one thing; if the percentages are 5, 20, and 75, respectively, they are quite another [744].

Freezing Rate

The rate of freezing is a factor that significantly affects the size, number and distribution of ice formations. Products of different size, age and physiological condition show different histological structure of tissue when frozen. Other factors that may affect the appearance of the frozen tissue are precooling and lapse between picking and the time of freezing the fruits and vegetables, or between killing and freezing of animals.

In the freezing of poultry it has been shown that, regardless of the freezing method employed, similar striated muscle tissue, if passed through the period of crystallization at the same rate, will exhibit a similar structure so far as ice formations are concerned. If frozen slowly, water will be lost by the fibers and will be frozen externally to the fibers. If frozen rapidly, the water will be frozen within the fibers.

A particular temperature, somewhat lower than the one producing extra-fiber freezing, will induce the formation of a single large column of ice located in the fiber. Lower temperatures will cause the formation of a few or many intra-fiber ice columns. If the temperatures are sufficiently depressed, the ice crystals will be evenly distributed throughout the fiber and will be of microscopic dimensions. When freezing occurs within the fibers, the ice columns are arranged parallel to the long axis of the fiber; when freezing is external, the formations are arranged, in general, parallel to the direction of the bundles of fibers [977].

Work done by Koonz and Ramsbottom [977] shows that chicken muscle, frozen in acetone at −75.6 deg. F., has all of the intracellular fluid frozen within the cell wall. Frozen in air at −40 deg. F., similar birds show the water frozen as columns of ice in the center of the muscle fiber, with the protoplasm of the cells squeezed to the periphery. The sarcolemma remains intact. When all the water of the tissue is frozen within the cells, reconstituting by thawing gives an almost unfrozen picture [1228]. In contrast with these results, one must consider the work of Plank, Moran [1137] and others. On studies of meats other than poultry, these workers found that the

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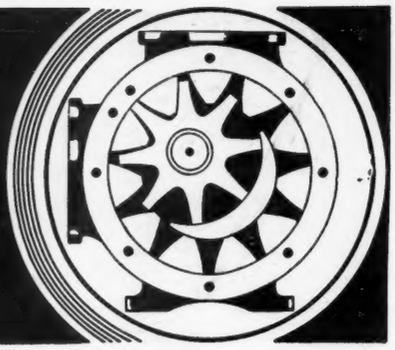

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ultimate crystallization of the "bound water" of the cell which takes place at −148 deg. F. causes a denaturing of the proteins so that they do not again absorb the water.

Reuters [4], in Germany, showed that the structure of the muscles of pieces of haddock, frozen at very high rates by immersion in liquid carbon dioxide, were indistinguishable from the muscles of fresh unfrozen haddock.

The work of Cox and MacMasters [7] with fruits indicated that dissolved gases are forced out during the freezing process. They are not responsible for all rupture, however, such rupture being due entirely to ice crystal formation [536].

Microscopic Technics

Several technics for microscopic study of the changes during freezing have been developed. Woodroof recommends a temperature between 18 and 20 deg. F. for proper functioning of a microtome to prevent partial thawing with handling [1634]. An adaptation of the Altman-Gersk method of freezing-drying holds promise. This method consists of instantaneous freezing of the tissues by immersion in pentane at −200 deg. F. or isopentane at −325 deg. F. followed by vacuum dehydration at subzero temperatures [977].

It is difficult to distinguish the cell-wall ice crystal interface of sections prepared as above. Attempts have been made at Georgia Tech to stain the walls of the vegetables prior to harvesting, in order to demonstrate histological changes without thawing the tissues. The results of this work will be reported in a later article.

Discussion

The literature search and conferences with workers in the field made obvious the necessity for developing testing technics to evaluate the data with a satisfactory degree of accuracy. Verbal descriptions of color changes on freezing and storage are obviously unsatisfactory. Spectrographic analysis had been carried out only on purees of the food and apparently was unusable for determining color changes of gross specimens.

Color photography has been found satisfactory, and details of this work will be presented in a future article. Data obtained to date on the structure of ice crystals do not show any essential relationship between the growth of crystals and the chemical and physical structures of the foods. Conversely, little data are available to indicate how much freezing can

take place and still allow the water to return to its original locus by controlled thawing.

Directly connected with the overall problem are the heat transfer characteristics of foods. If these are known, the times required for optimum freezing of individual foods can be calculated. Data, and a method for such calculations, are to be reported.

To date, inactivation of enzymes by blanching is conducted under empirical rules. During blanching, proteins are denatured, but little work has been done to show the effect, if any, of this denaturation on the nutritional values of the food.

Immediate and practical problems on which accurate data are needed include: (1) A study of potential solvents for immersion freezing; (2) Optimum storage conditions; (3) Perfected packaging with consideration for both storage and consumer interests and (4) State of maturity and varietal selection of the foods most suitable for freezing.

Work so far has been concentrated on: Development of analytical technics to obtain reproducible data; study of the heat transfer characteristics of foods; and experimental freezing of string beans, lima beans, peas, strawberries and peaches under controlled fast (immersion) and slow (in still air) freezing conditions. The results of these individual phases will probably be presented in the near future.

—End—

Glycol System

(*Continued from page* 80)

ventional-type system been in the process of installation, would have resulted in extremely high change costs, due to probable junking of duct work and in some cases even junking of air washers and replacement with larger or smaller equipment to meet the new design loads. Actual change costs were comparatively negligible due to the flexibility of the new system.

Germicidal Effects

There is an additional advantage in the use of glycol in the air-conditioning system. Tests have been made which indicate that considerable benefits will be derived from the glycol as a sterilization agent. Triethylene glycol selected as the liquid sorbent was not chosen for its sterilizing qualities. Such qualities are extras at no cost. All fresh air en-

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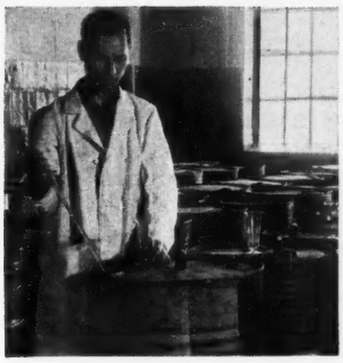

At each step in their production, FRITZSCHE Seasoning Oils and Flavors take on added values. Quality control, for example, begins with the raw material's arrival at our plant. Here, samples are drawn off from *each container* (illustrated) for individual examination and analysis. To be accepted, they must meet the rigid standards set up by our Quality Control Laboratory . . . Write us for FREE Flavor Cost Calculator and . . .

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Whether used in freezing, canning or dehydrating . . . on sorting tables, in scalders, washers or cookers . . . for bulk or packaged goods . . . La Porte Flexible Steel Conveyor Belting gives efficient, worry-free service. Its non-corrosive metal is not effected by steam, water or extreme temperatures. Its strong, flexible construction will not stretch out of shape . . . slip . . . weave . . . or jump. It is easily and quickly cleaned and sterilized with steam or hot water, and no special dressings or belt lacers are needed to keep it in peak condition.

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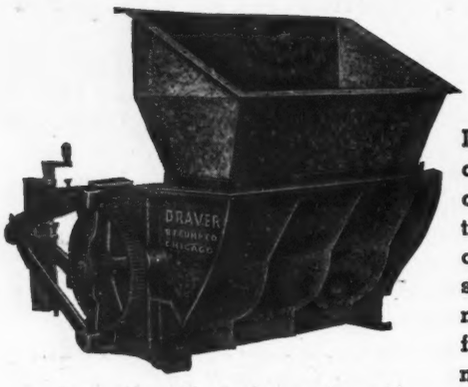
DRAVER Vegetable FEEDERS

2 or 350 bu. per hr.



Draver Vegetable Feeder complete with Style "A" galvanized hopper. Furnished for capacities as little as 2 to 30 and as large as 30 to 350 bushels of vegetables per hour.

Draver Vegetable Feeders are especially designed and built to feed—accurately and continuously—a controlled amount of beans, peas, diced carrots or potatoes, cut corn, and similar sized vegetables and other materials, to picking tables, cookers, freezers, or other processing equipment. Nine capacity ranges are available.

All Draver Vegetable Feeders are completely galvanized and can be furnished for belt or chain drive or direct motor driven. Each Feeder is a complete, self-contained unit, ready to install and operate. Plan to control your continuous production with Dravers. Write today for complete information!

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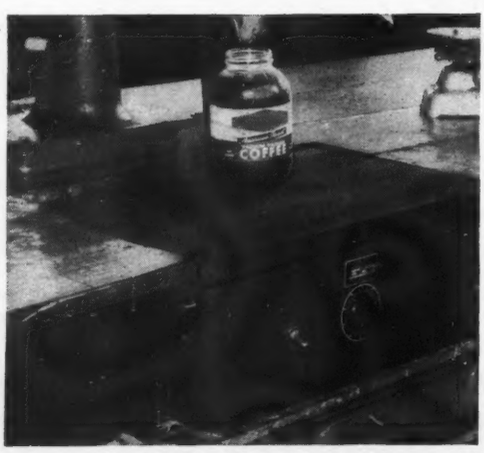

PJ-15 Electric Packer settling coffee

—by eliminating slow, laborious hand pounding, bumping and jarring.

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3600 rheostat-controlled vibrations per minute from the electric models—100 short, sharp jolts per minute from the hydraulic models.

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tering production areas and comfort conditioned zones is filtered and passed through triethylene glycol spray chambers.

Summary of Major Features

The low operational cost as compared with conventional systems, the flexibility and simplification of design which permits inexpensive accommodation of the system to area load changes, separate temperature and relative humidity control, and the elimination of unsightly duct work are only a few of the major features. The "no draft—no stratification", air sterilization, and precision control are accomplished at no additional installation costs since they are a by-product of design. The Cummings System at Necco has many of the desirable features which industry in general has needed for some time.

—End—

Packaging Macaroni

(*Continued from page* 91)

Automatic weighing of long goods is difficult and has not yet been successfully accomplished. One difficulty is the large variety of types of long goods, like ziti, maccaroncelli, bucatini and vermicelli. Another is the problem of bent macaroni. Often the macaroni drying sticks warp, leaving the strands of macaroni crooked after they are cut.

Many operations are performed on the Redington line: Dry waxed paper is supplied to each line in rolls. A web of paper goes through feed rolls, between rotary shearer knives. Here a paper wrapper is cut, then fed to a conveyor with pockets corresponding to the length and width of the macaroni carton.

Next, a mechanism lines the pockets with a wrapper. The wrapper is held securely in the pockets in two ways:

1. By folding each end of the wrapper into the space between adjacent pockets.
2. By piercing the wrapper with pins located on one wall of the pocket.

The next operation is hand-weighing. Operators, provided with a scale and a box of macaroni, weigh out the proper amount of macaroni. The macaroni is placed in the conveyor pockets, lined with the paper wrapper.

Before the macaroni is wrapped, the ends of each strand are lined up so that loose strands do not protrude and interfere with the wrapping

mechanism. This is done with a paddle pushing mechanism, located at both ends of each product.

Wrapping is the next step. Fingers, located on both sides of the bucket or "pocket" conveyor, lift the wrapper from between the pockets and off the pins. An operated folder now turns the left side of the wrapper under the right edge, which has been folded down by a top plate. The top plate then holds this seam secure. Wrapping is completed with the folding of each end of the wrapper, down and under the package.

After the macaroni is wrapped it is inserted into cartons. The cartons are fed from the bottom of a carton magazine by vacuum rubber cups. As the cartons leave the magazine, they are expanded and transferred into the pockets of a carton conveyor. This conveyor travels alongside and in line with the one containing the wrapped macaroni. At the filling position, the macaroni is inserted into the carton.

Gluing the cartons is the final step. The gluing mechanism is equipped with vertical rollers at each end of the conveyor. As the carton flaps are turned upward, they pick up glue from the rollers.

Sealing the cartons takes four steps: First, the side flaps at each end of the cartons are folded in. Second, the bottom flaps are turned in and glued to the side flaps. Third, the upper flaps are glued down. Finally, the cartons travel through a drier conveyor, approximately 9 ft. long. After the cartons leave the drier, the glue has set and the cartons are ready for packing and shipment.

Case Loading and Gluing

All cartoned macaroni goods—short, long and fluffy—are automatically collected and packed into cases. The cases are glued and sealed with Standard-Knapp machines.

Not only are these operations continuous, but there are four other advantages:

1. Labor savings—only one operator (instead of from four to six) is needed to collect and pack cartons into cases and glue and seal cases.
2. Automatic case gluing operation is better—more uniform and economical than the hand operation.
3. Top and bottom of cases are glued simultaneously and automatically. With hand method, it was first necessary to glue bottom of cases before loading cartons into them. Later, tops of cases were either glued or taped by hand.
4. Top and bottom of cases are sealed and compressed before cases

Fig. 1571
Bronze Air Cock

That h-i-s-s-s-s-s you may hear around your air lines means there's a villain loose in your plant. Costly compressed air is escaping, costing you money by the minute. But, you say . . . "it's only a pinhole, can't amount to much." Look at the chart below.

A SMALL LEAK MAY COST YOU AS MUCH AS $5.82 A MONTH

AREA OF LEAK	AIR	
Diameter Inches	Number of cubic feet per month at 75 lb. pressure	Total cost of waste per month 11c per 1000 cubic feet
1/4"	3,366,990	$ 370.37
1/8"	824,570	$ 90.70
1/16"	213,000	$ 23.43
1/32"	52,910	$ 5.82

Check your plant . . . compressed air leaks mean that good dollars are "gone with the wind." Replace leaky or defective air devices with LUNKENHEIMER Air Cocks, Valves, Nozzles. Designed for air line service, LUNKENHEIMER Air Devices seat tight and stay tight, requiring minimum maintenance for long, efficient service life. Your Lunkenheimer Distributor has a stock of these devices and fittings. *Write for Circular No. 587 and enlarged copy of air leak chart, suitable for posting.*

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THIS TIME I'M MONEL

. . . you can see from my silvery-white color. Just about every industry uses me . . . for strainers, filters, sieves, vibrator screens, dipping baskets, conveyor belts. Brother, I've got friends!

I'M ONE-THIRD COPPER

. . . and 2/3 nickel. That gives me "oomph" (strong, tough and hard, to you). I'm much stronger than common brasses and bronzes.

SLICK & SMOOTH - THAT'S ME

See my glossy surface? It stays that way. I don't clog, either. Things just whiz through me.

MAYBE YOU CAN'T RESIST ME

but I'M resistant. Rust? Poof . . . I'm immune to it. Corrosion? High temperatures? Kid's stuff! Abrasion? Stress? I wear like . . . . MONEL!

IT'S A CINCH TO FORM & JOIN ME

Do I form easily? Say, I'm ductile. Any shape you like. What's more, I can be welded, brazed or soldered.

I COST LESS

than any corrosion-resisting wire cloth of equally high strength.

"Buffalo" Monel Wire Cloth is woven in a large range of meshes from very fine to coarse, in all standard weaves.

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are stacked. All but top cases in a stack are sealed when glued by hand.

Steps on the Standard-Knapp line:

Lines from two cartoning machines travel into a collector. The collector discharges the cartons into two balanced lines regardless of whether both filling or cartoning lines are running.

These two lines of cartons are then fed into a case packer. The packer automatically forms the load —5 x 2 x 2 (20) cartons for macaroni. A case is placed over a funnel by an operator, and the packer automatically pushes the load of cartons into the case.

At this point, the case is automatically discharged onto a conveyor, and turned in the proper direction to travel lengthwise into the gluer. The cases are automatically timed into the gluer and pushed through by a carrier bar.

As the cases enter the gluer, the top and bottom outer flaps are spread out horizontally. These flaps pass through the rollers where glue is applied. The flaps are then closed to seal the cases.

In the final step, the cases enter the compression unit. This unit holds the cases under compression to allow the glue to set. Finally, the sealed cases are discharged by conveyor to the warehouse, freight car or truck.

—End—

Packaged Goods and ERP

(*Continued from page 77*)

supply and demand has dictated higher prices for these grains, and for the products of which they are basic ingredients.

Meat packers and manufacturers of cereals, macaroni, baked goods, and other grain products have been faced with ever-increasing costs of raw materials and have been forced to reflect these costs in increased selling prices. Meat is probably the best example, but the situation has prevailed in many lines. On the other hand, the prices of canned fruits and vegetables, of dried fruits and vegetables, and of many other non-grain products have remained steady and, in many instances, have decreased. This has been particularly true where there has been a supply in excess of demand.

This indicates that a better overall balance is needed in order to create a lower price level of any significance. It certainly seems plausible to expect that reduced purchases of

the short supply commodities and increased purchases of those in plentiful supply will create the balance. It is true that government purchase of the latter products will work to avoid surpluses and therefore act to place a floor under their selling prices, but this would be more than offset by anticipated lower price levels on those grain and grain-manufactured products that have been in short supply and higher priced.

A healthier food economy, with benefits to both business and public would be the inevitable result.

Building Markets

The export of more processed foods under the ERP would also be of great advantage to American exporters and to American "win the peace" efforts.

I believe most manufacturers recognize that ultimate conversion to a full peacetime economy, coupled with the recovery of the European nations to whom we are shipping so much food and materials, is going to leave them geared to a production much greater than the domestic demand. They are therefore doing some long-range thinking with respect to the building of private trade export markets that would absorb the surplus production and thus maintain sales volume and full employment.

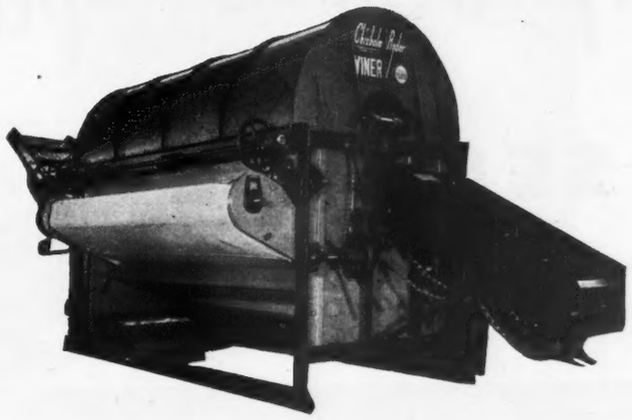
The ability to build these markets would be enhanced by immediate increased exports of labeled and trademarked goods. Brand recognition would be created where it does not now exist, the industry would have an opportunity to learn the types of processed foods desired in the various countries, and distribution channels would be more familiar with the handling of American goods.

This reasoning might be regarded as selfishness, but it is not wholly so. It is naturally predicated upon the desire of our industry to maintain a large sales volume, and to earn the profits that might result, but it also affords an opportunity to aid American efforts to sell the free enterprise system and halt the inroads of Communism.

Food has been universally recognized as our most powerful weapon in accomplishing this task. The weapon, however, loses much of its power when the people who receive American food don't know where it came from or that it is a product of a democratic system. You can't put a "Made In U.S.A." label on a grain of wheat!

It follows, then, that the increased shipment of labeled processed foods

CRCO VINERS
For Peas and Limas



The Viner That Meets Varying Crop Conditions

CRCO Viners for peas, blackeyed peas and lima beans are the most versatile Viners made. Among the exclusive features in the CRCO Model 1635 Viner are those that assure a complete recovery of peas, absolute control over the number of blows given to the vines and a variable speed feature which reduces splits.

With the CRCO Adjustable Cylinder and Variable Speed Control, the operator can meet any growing conditions that would ordinarily retard the efficiency of older types. Every operation is under absolute control and can be varied to meet crop conditions.

Send for special descriptive Bulletin covering the famous 1600 Series of Steel Frame Viners.

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(183)

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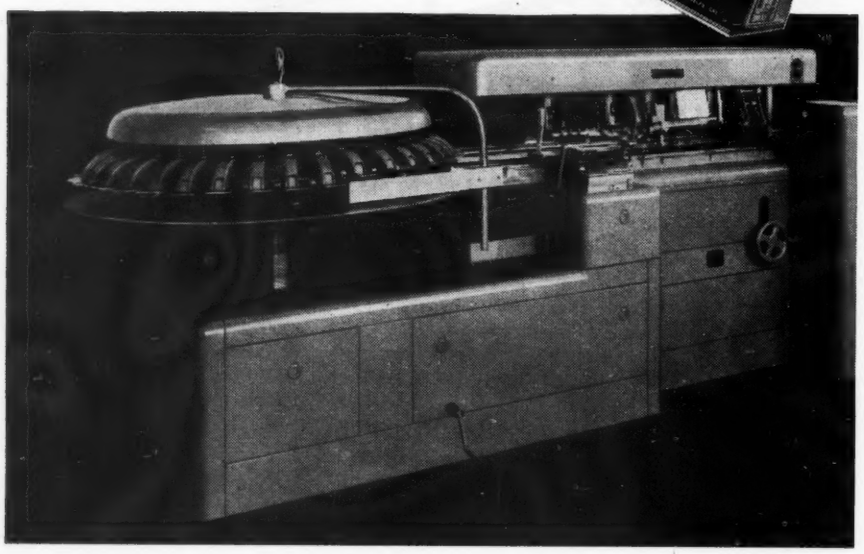

- **A SEALTITE** bag package is ideal for coffee, sugar, salt, flour, starch, cereal or any product usually packed in a paper bag.
- Any **STANDARD** gusseted bag can be used... no special premium priced bag is necessary.
- **SEALTITE** settles, shapes and seals 2 to 10 lb. bags at speeds ranging from 30 to 50 bags per minute.
- **SEALTITE** delivers a square, flat-topped package that is sift-proof and can be stacked like a carton.
- Users report savings as high as $500.00 per month per machine with **SEALTITE.**

Write for prices and delivery

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to the European countries will automatically convey to its foreign users that these are American-made goods, produced under a capitalistic system, a system so bountiful that its food can be shared with the hungry people of many other nations.

If Mr. Hoffman and his aides in the Economic Cooperation Administration will consider all of these advantages of using more processed foods for relief feeding purposes, they will find that they outweigh all of the past objections raised and that the place of processed foods in the European Recovery Program should be much greater in the future than it has been in the past.

—End—

"Salmonella"

(*Continued from page* 113)

examined samples of powder stored at 35.6 deg. F. A few of the samples which were negative on the first or second repeat examinations later yielded Salmonella either of the same or different type as that isolated originally. Other samples contained not only the type originally isolated but one or more additional types as well. In five separate instances the type recovered on the third re-examination was not the type initially isolated from the sample. In the samples held at 80.6 deg. F., Salmonella types recovered from more than half the 20 positive samples were not the types initially isolated. These findings corroborate those of an earlier investigation.[2]

The high percentages of naturally contaminated powders from which Salmonella organisms were recoverable after several months' storage at 35.6 and 80.6 deg. F. is particularly striking in view of the fact that these samples probably contained relatively few in comparison with the numbers contained in the artificially contaminated powders. Moreover, it might have been possible to isolate Salmonella organisms from samples over much longer periods than those recorded, had the samples been adequate for further analyses.

Longevity of Salmonella

Additional evidence of the longevity of Salmonella organism in spray-dried whole-egg powder is contained in data recently published by the Medical Research Council of Great Britain.[3] British bacteriologists examined 5,852 samples of U. S. egg powder and found 11.1 percent to be contaminated with Salmonella. With respect to the age of the sam-

ples, they state: "Samples were examined as soon after their arrival at the laboratory as practicable. An interval of 1 to 3 months appears to have elapsed between the actual drying process and packing, and a further 3 to 12 months between packing and examination at the laboratory."

It has been shown that the viability of Salmonella organisms in whole egg powder is of long duration under storage conditions required for the maintenance of quality. It may be concluded that a preliminary storage period, prior to consumer use, cannot be depended upon to eliminate these organisms from contaminated egg powder and consequently that the production of a Salmonella-free product is of primary importance.

Acknowledgment

The author wishes to thank Mathilde Solowey and V. H. McFarlane, Microbiology Research Division, for their assistance in the planning of this work and preparation of the manuscript; O. J. Kahlenberg, Dairy & Poultry Branch Laboratory, Production & Marketing Administration, USDA, Chicago, for solubility and moisture determinations; and E. H. Spaulding, Dept. of Bacteriology & Immunology, Temple University School of Medicine, Philadelphia, for serological identification of Salmonella types.

References

1. M. Solowey, V. H. McFarlane, E. H. Spaulding and C. Chemerda. Microbiology of Spray-Dried Whole Egg. II. Incidence and Types of Salmonella. *American Journal of Public Health.* 37 (8), 971-82, August, 1947.
2. M. Solowey, A. Rosenstadt, E. H. Spaulding and C. Chemerda. Occurrence of Multiple Salmonella Types in Spray-Dried Whole-Egg Powder. *Poultry Science.* 27 (1), 12-16, January, 1948.
3. Medical Research Council (Great Britain). The Bacteriology of Spray-Dried Egg with Particular Reference to Food Poisoning. Special Report Series No. 260. Published by His Majesty's Stationery Office (London), 1947.

—End—

Flour Bleaches

(*Continued from page* 83)

legally bromated, at present, are those with protein content of 15 percent or more on a moisture-free basis. (13 percent on air-dry basis).

Identity Standard

A preliminary hearing was held, March 24, before the Federal Security Agency in Washington to consider revision of the definition and standard of identity for bromated flour. May 6 was set as last date for filing briefs. A decision on the proposed revision may be announced at any time.

This brief discussion of bleaching

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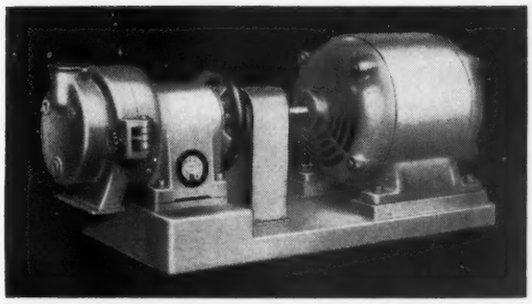

Especially built to blend hydrogenated oil with ground nuts to produce smooth butter of lasting stability. Ample heat generated to soften oil for mixing. Built-in thermometer and load indicator afford accurate control data.

Capacity with 20 h.p. motor, direct or belt drive, 2,500 lbs. per hour. Output can be reduced to suit smaller plants. Results are equally satisfactory at any rate of production.

Texturizer can be connected to one or two nut grinders and mounted over filling machine hopper. Dimensions with direct motor drive, 18x45x17 in.; weight, 600 lbs.

Write, wire, or phone for full information.

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Now Available With J & C's Newest Development....The *Floating Cone!*

J & C Power-Control Unit may be located at any point convenient to the operator.

JACKSON & CHURCH COMPANY'S ZENITH CONTINUOUS PULP PRESS offers GREATER efficiency and GREATER profits . . . with the hydraulically-operated cake discharge port or "floating cone."

Long the finest dewaterer on the market, Zenith's new 100% automatic operation assures **CONSTANT, UNIFORM** discharge pressures at any pre-determined degree. Finger-tip adjustment assures drier cake of uniform consistency.

These J & C engineering triumphs . . . **found only in Zenith Press** . . . are available to paper pulp manufacturers, canneries, corn starch plants, fish reduction plants, meat packers, glue plants, and citrus waste drying plants.

For engineering or additional data write Jackson & Church Company at Saginaw, Michigan.

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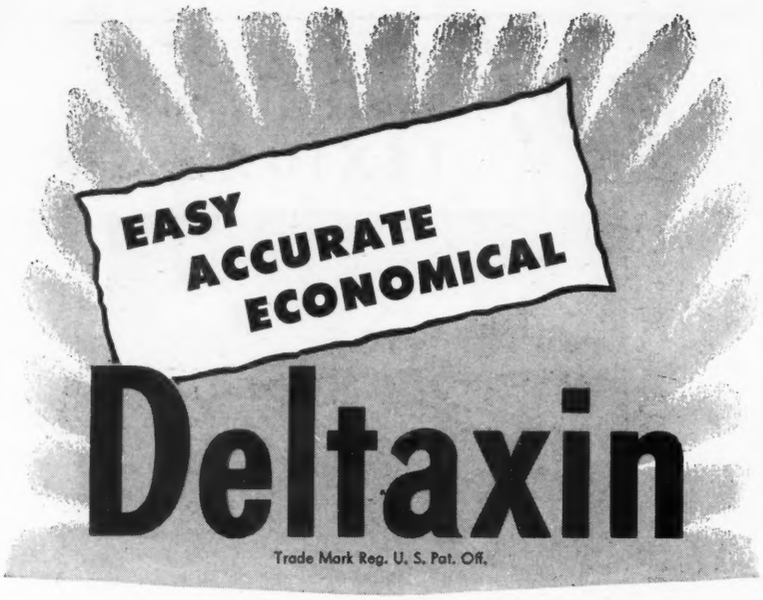

WINTHROP-STEARNS' BRAND OF CALCIFEROL

PURE CRYSTALLINE VITAMIN D_2

For Fortification of Fluid Milk and Other Foods

Why not use Vitamin D in its *purest, most potent form* for easy, accurate, economical fortification of fluid milk?

DELTAXIN dissolved in propylene glycol is an outstanding vitamin D concentrate with these advantages:

1. Contains purest known form of vitamin D_2 with uniform potency, not affected by pasteurization.

2. Propylene glycol as solvent insures rapid and thorough dispersion of vitamin D.

3. Simply "measure-and-add" direct to milk, saves time and money.

4. Stable, does not become rancid, does not affect color, odor or taste of milk.

5. No changes in your production set-up, no emulsifiers or extra equipment, no license or royalty fees.

The Council on Foods and Nutrition of the American Medical Association has declared Calciferol in Propylene Glycol suitable for the fortification of Council accepted vitamin D milk.

Sold in four sizes for the convenience of small and large dairies.

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B-E-T-S*—The original Food-Enrichment Tablet for Bread and Macaroni Proaucts.

VEXTRAM*—The First Starch Base Mixture for Enrichment of Flour, Corn and Macaroni Products.

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PURE CRYSTALLINE VITAMIN D_3—For Fortification of Evaporated Milk.

ASCORBIC ACID—To retard browning, retain flavor of Frozen Fruits.

Pure Crystalline Vitamins in Bulk

Vitamin B_1 — Niacin
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AMINO ACIDS

ROCCAL*—powerful sanitizing agent; non-toxic, tasteless, odorless, non-corrosive.*

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and maturing agents and their actions has been confined to the flour treatments commonly practiced.

Chlorine Dioxide Bleach

In the event Agene is withdrawn and its use discontinued, other bleaching and maturing agents will be used. Experimental work is progressing on several that show promise. There is the possibility that one of them, chlorine dioxide, will be available shortly.

Preliminary work with chlorine dioxide has been underway for several years and experimental installations are now operating in several large mills. Flour treated with this bleaching and maturing agent is comparable to Agene-treated flour in baking quality. Sensitivity of flour to the chlorine dioxide bleach is somewhat greater than to Agene. Metering equipment must be redesigned as an aid in overcoming this difficulty. The gas itself presents a safety problem, in that it is explosive under certain conditions.

These difficulties are being overcome and in the next few months announcement may be made that the metering equipment, as well as the chlorine dioxide itself, is ready for full-scale industrial application.

—End—

Milk Shortage

(*Continued from page* 122)

creased stability, educational material for mess personnel in its preparation and simple mixing devices were named as essential for its unprejudiced use and wide consumption by all branches of the Armed Forces.

Continuous research in the processing and manufacture of milk products with ion-exchanger materials has produced a superior variety of dairy foods, according to O. F. Garrett, M & R Dietetic Laboratories, Inc., Columbus, Ohio.

Industrial application of the ionic exchange process has resulted in products having improved stability and storage properties, high nutritive characteristics and taste improvement. These improved milk products have also found wider acceptance and utilization in and with other foods. Some examples are:

(1) Ice creams, which do not develop "sandiness" upon freezing or holding for long storage periods, and in which normal melting properties are maintained and overrun and whipping characteristics increased.

(2) Soluble sodium caseinate, from precipitated casein, which is low in total ash and in calcium and phosphorus and which has superior storage properties; it is an excellent stabilizer for ice cream and can be used as an emulsifier for other products such as mayonnaise.

(3) Dried cream products containing 50 to 75 percent butterfat which reconstitute well in water and are stable in hot coffee. These products can be used on acid fruits, such as strawberries, without curdling and in making creamed soups and caramel candies.

(4) Evaporated milk with greater stability and with variations in calcium content no greater than in normal milk, with color and flavor equivalent to that of milk made in the conventional manner, and with no calcium phosphate separation although containing as high as 30 to 39 percent total solids.

(5) Lactose recovered from whey; although not meeting USP standards, it is of high quality and may be used as an ingredient in the manufacture of various food products.

—End—

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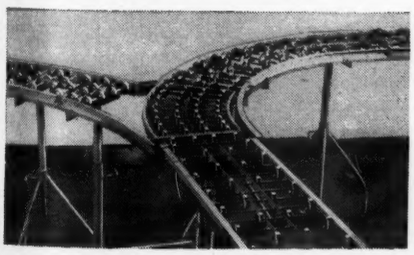

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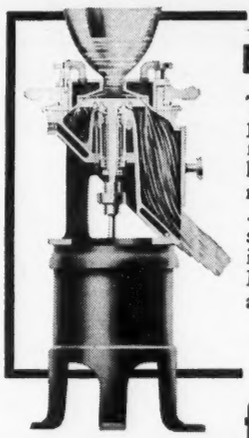

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